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JOURNAL OF THE BRITISH MEDICAL ASSOCIATION

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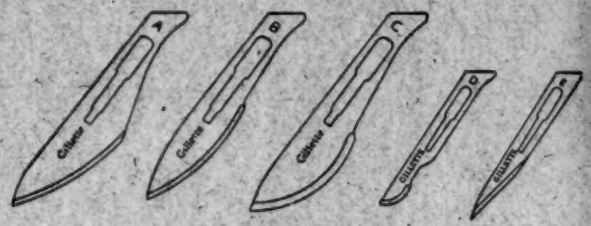

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* See The British Medical Journal, 24th August, 1946.

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BRITISH MEDICAL JOURNAL

LONDON SATURDAY JULY 29 1950

PROGRESS AND TRENDS IN THE SCIENCE OF ANATOMY*

BY

W. E. LE GROS CLARK, D.Sc., F.R.C.S., F.R.S.

Professor of Anatomy, University of Oxford

I well recollect, at the International Anatomical Congress held 20 years ago at Amsterdam, hearing that distinguished anatomist the late Professor C. U. Ariëns Kappers deliver a notable presidential address of welcome. In the course of his address, without any hesitation and with perfect fluency, he changed about from one language to another, speaking as easily in Dutch, French, English, German, and Italian. I fear I am quite unable to emulate such remarkable linguistic ability in welcoming the delegates of the International Anatomical Congress now meeting at Oxford, and I am therefore limited to addressing you in my own language.

Welcome to Oxford

On behalf of the Anatomical Society of Great Britain and Ireland, and of the University of Oxford, I offer you all a sincere welcome. We may not be able to claim for Oxford the tradition of a great teaching school of anatomy which can parallel the glories of the mediaeval Continental schools such as those of Padua, Montpellier, Leiden, and Uppsala, but we can look back with pride on a line of renowned anatomists who lived and worked in this university, leaving their names firmly engraved on the list of the great scientific worthies of Oxford. Such names as Harvey, Willis, Lower, and Highmore need no commentary from me, for they will already mean much to you. We meet here in a building which they, in their time, also frequented; and even now, after so many years, you will be able to capture something of the atmosphere in which they worked as you wander round the old colleges and their beautiful gardens. I like to feel that the meeting of this international congress at Oxford is in some sense a tribute to their honoured memory, as I am also certain that, in our deliberations here, we shall derive inspiration from the thought that long ago they too deliberated on similar matters in the same surroundings.

We are proud to welcome anatomists from so many parts of the world, representing no fewer than 35 different countries, and proud also that (in spite of difficulties of travel) you have come in such numbers. This is the fifth of the International Anatomical Congresses which have so far been held, and it is a striking indication of the continuing vigour of our ancient and venerable science that the delegates outnumber those of any previous congress.

Anatomy has always been recognized as one of the most fundamental of all the biological sciences, and for this reason it has never ceased to be a lively and active subject. But it appears to me that during the last 10 years or so it has been still further invigorated by the impetus of many new developments. Perhaps one of the most notable of these developments is the application of new technical methods, and particularly experimental methods, to the study of anatomical problems on a much wider and more intensive scale than has hitherto been usual. In many cases these methods demand a high degree of manipulative skill and technical ingenuity, and the opportunities which they offer have drawn into the field of anatomical research numbers of young scientists of exceptional ability who are eager to apply them to fundamental problems of structural organization. Anatomical research has also come to have a closer reference to the actualities of living organs and tissues than has often been the case in the past, so that the anatomist finds himself much more intimately concerned with the functional implications of the structural detail whose analysis is his particular province. In his attempts to correlate as directly as possible structure with function he has inevitably been brought into a closer collaborative association with his physiological colleagues, and this working relationship has without doubt been a most potent factor in some of the outstanding advances in both subjects during recent years. For not only has the anatomist become more and more physiologically minded, the physiologist has also become more and more anatomically minded. Indeed, so much is this the case that in some universities the casual visitor may be forgiven if, on first entering a department, he is undecided whether it is concerned primarily with anatomy or physiology. It seems, indeed, that the artificial boundary between "anatomy" and "physiology" which had developed rather strongly in the early part of this century is now breaking down altogether (both in teaching and in research). This, it should be emphasized, is not really such a new development as it may appear to be; rather it is a reversion to the attitude of many of the older anatomists. Harvey and Hunter, for example, both cultivated assiduously the experimental method in pursuing their studies.

With the application of new technical methods to anatomical research, anatomy departments are becoming far better equipped with laboratories, apparatus, and technical assistance. Accommodation for experimental animals, which at one time was limited to the physiology department of a medical school, is now generally regarded as no less necessary for the anatomy department. Anatomy, it will be agreed, has as its ultimate aim the study of the form

*Presidential address delivered at the International Anatomical Congress at Oxford, July 25, 1950.

and structure of the living organism, and it must therefore necessarily concern itself with the investigation of all those factors which determine or modify form and structure, whether chemical, physical, physiological, developmental, or phylogenetic. Hence the anatomist in the pursuit of his inquiries may need to employ technical and experimental methods of great variety borrowed from other fields of science. Yet in doing so he must constantly hold in view his primary duty—the investigation and interpretation of structure.

I should like to emphasize rather strongly what I conceive to be the proper role of the anatomist. Clearly it is undesirable, and also impossible, to confine the anatomist and physiologist to arbitrarily defined limits of their subjects. The physiologist in following his inquiries into function may find it necessary to make a parallel study of the underlying anatomical mechanisms involved, and the anatomist in his study of structural organization may require to pursue his studies into the realm of pure function in order satisfactorily to understand the full significance of anatomical details. This complementary overlap of the interests and activities of anatomists and physiologists, which has become so evident in recent years, can only be of the greatest advantage to both groups of workers, but it would also be a severe handicap to both if, as a result of such a community of interest, the importance of pure morphology should be in any way underestimated or belittled.

One of the main features of the science of anatomy has always been the unusually wide scope of its activities. As I have stated elsewhere, the subject naturally embraces the whole range of organic structure—that is, the organization of the elementary components of living matter into a complete cell, the organization of cells into tissues, of tissues into organs, or organs into systems, and finally of systems into fully integrated living creatures. But, more than this, it is also a historical subject in so far as it is concerned with the genesis and growth of tissues and organs from the germ cell, and with the evolutionary origin and development of all the varied manifestations of structural organization during the dim and distant ages of the geological past. This diversity of interests is well illustrated by the list of contributions to be presented at our congress. A reference to this list provides an opportunity for a brief review of recent progress and current trends in the different branches of anatomical science, and this is perhaps the more appropriate because it is 15 years since an international gathering of anatomists was last held. The expansion of anatomical research now proceeding in so many fields, and the increasing specialization in some of these fields, obviously makes it impossible for any one individual to survey the whole subject in any way adequately. What I have to say, therefore, is based on a personal impression which may not always be well informed and which necessarily has strict limitations.

General and Comparative Anatomy

The term "general anatomy," like the term "general physiology," is not altogether satisfactory. It is taken to include those aspects of anatomical study which do not readily lend themselves to the distinction of a special category. It includes gross and topographical anatomy, subjects in which a great deal of important knowledge has been accumulated (and still continues to be accumulated) by the time-honoured method of skilful dissection with scalpel and forceps. In its application to the needs of clinical diagnosis and treatment the study of gross anatomy is no less important now than it has been for many years in the past. Indeed, in some respects its importance has been enhanced, particularly as the surgeon develops new technical methods which permit him to deal with regions of the body not previously accessible to his art. Recent progress in intracranial and thoracic surgery, for example, has revealed serious gaps in our knowledge of certain important details of topographical anatomy, and these gaps are now being filled by intensive studies by many anatomists. These studies include the visualization of the gross pattern of vascular trees or duct systems by the use of appropriate injection masses, the preparation of corrosion specimens, the application of stereo-photography, and the use of radiographic methods. With the more refined techniques which have now been developed some anatomists have been able to make preparations which are not only of great practical value but have an impressive beauty of their own. The need for a much more detailed knowledge of the vascularization of muscles and nerves in the treatment of injuries became very apparent in the war, and led to much intensive research which has yielded a great deal of important information for the orthopaedic surgeon. Of particular interest are the investigations of the vascular patterns of various organs (for example, the lung, kidney, liver, and testis); for it is being demonstrated that the nature of these patterns has a more important reference to pathological conditions and operative technique than has been fully appreciated in the past. The anatomical evidence for a vascular "by-pass" mechanism in the kidney has directed attention to the possible importance of similar mechanisms in other organs, and already valuable information is being gathered from studies of the liver, stomach, spleen, etc. Special mention should be made here of the employment of radiographic and micro-radiographic techniques for the study of these vascular arrangements.

The study of muscular action and joint movements in man has received a new impetus from the realization of its importance in what has been termed "ergonomics"—that is, the study of man in relation to his working environment. Many of the statements contained in textbooks of anatomy regarding the mechanism of muscles and joints are, it appears, the result of inferences based on the study of the cadaver, and are found to be not altogether applicable to the living body. These questions are now being investigated more directly in the living human subject by new methods such as electromyography and strain-gauge dynamometry, and already some very significant results are beginning to appear. An interesting field of work is also being opened up by a detailed analysis of the mechanics of joint movement in relation to theories of lubrication, by studies of variations in the viscosity of synovial fluid in joints of different types of movement, and by intensive investigations on the nature and absorptive power of synovial membrane, the innervation and lymphatic drainage of capsular structures, and so forth. The importance of all this work for the proper understanding of arthritic conditions will be quite apparent.

The study of comparative anatomy still has an important part to play in problems of systematics, and as an essential adjunct to the study of comparative physiology. The need for more detailed knowledge in this field is also becoming apparent in connexion with palaeontological studies. For example, the discovery of the skeletal remains of extinct primates (particularly those of the early apes of the Miocene period) has shown that the interpretation of certain of their morphological features can be satisfactorily determined only by a more detailed knowledge of the anatomy of existing forms. There is an obvious need here for the comparative anatomist to work in close collaboration with the palaeontologist.

Neurological Anatomy

The large number of papers on the nervous system to be presented at this congress is a significant commentary on the active state of neuro-anatomy. Progress in the study of the central nervous system has been stimulated by the development of a closer co-operation with neurophysiologists and by the use of more refined technical methods for determining the interconnexions of different parts of the brain and spinal cord. No doubt one of the significant contributions of the anatomist to the study of the central nervous system in the past has been the demonstration of the importance of structural differentiation for problems of functional localization. For example, the cyto-architectural contrasts in the cerebral cortex, the nuclear configurations of subcortical levels of the brain, and the demonstration of different patterns of fibre connexions between them had led to the suggestion that there must be a corresponding degree of functional differentiation and localization.

It is interesting to find that, with the more delicate electrophysiological techniques which have become available, this has now received some degree of confirmation from the physiologists. At the same time, the investigation by the physiologist of patterns of functional activity in the central nervous system has directed the attention of the anatomist to new problems of structural organization. In the investigation of these problems the development of a silver technique which permits the study of early stages of terminal axonal degeneration has been of the greatest importance, for this method enables us to determine fibre connexions with much more certainty and precision than has hitherto been possible. Combined with a more systematic use of the method of retrograde cell degeneration in young animals, and with the technique of "physiological neuronography," it has given a new impetus to the study of the anatomy of the central nervous system. Indeed, it has become clear that many of the current statements regarding fibre connexions, which have been accepted without serious questioning for years, amount to little more than rough approximations. Consequently the anatomist has before him the task of checking all the older descriptive accounts with the more refined methods now at his disposal. Already this has led to new observations which seem to be of considerable importance—as, for example, in the details of the sensory and motor paths of the brain and spinal cord, the connexions of different parts of the cerebellar cortex, and the elucidation of the anatomical basis of cortico-striate and cortico-hypothalamic functions.

Finally, in the consideration of the anatomy of fibre connexions and the relation of the latter to function it has become realized that it is not enough to know simply that there is a fibre connexion leading from one functional centre to another in the nervous system. There is good reason to suppose that sensory discrimination depends largely on patterns of stimulation of receptors (spatial or temporal), while co-ordinated muscular reactions are the result of specific patterns of stimulation of effector mechanisms. It thus becomes a matter of the greatest importance to determine also the pattern of the fibre connexions, in terms of the precise regional distribution of the different components of these connexions, as well as the spectrum of fibre size which makes up each fibre system. These investigations demand considerable technical skill, as well as much patient work, but the results to which they are leading are fully justifying the efforts put into them.

As a necessary corollary of the more intensive study of the interconnexions of different parts of the central nervous system much more systematic work is now being undertaken on the analysis of cyto-architecture. This applies not only to the more accurate delineation of cortical areas (and their individual and specific variations) but also to that of nuclear patterns in the brain stem and spinal cord. In connexion with these studies several very excellent atlases have been prepared which are of essential importance in their application to experimental investigations, and they mark one of the most fruitful results of the combined anatomical and electro-physiological approach to the investigation of the nervous system.

A development of neurological anatomy which calls for special mention is the application of experimental methods to the study of the organization of the central nervous system in submammalian vertebrates—particularly reptiles and birds. It has always been a matter of peculiar difficulty to equate the various nuclear masses in the brain of these vertebrates with those of mammals, and many of the homologies which have been suggested in the past are evidently based on little more than conjecture. Some of the results of experimental studies have already indicated that in the case of the reptilian brain the organization may be of such a specialized nature that it is perhaps impossible to establish strict homologies between some of the nuclear elements and those of the mammalian brain. Apart from their intrinsic interest, these observations, it is clear, may have important evolutionary implications.

The concentration of attention on patterns of conduction and excitation in the central nervous system has its counterpart in the study of the peripheral nervous system. For here also its importance is becoming increasingly recognized, both on the sensory and on the motor side. In the former case renewed efforts are being made to correlate patterns of innervation of cutaneous receptors with the phenomena of cutaneous sensation, and it is becoming clear that this problem is very much more complicated than has hitherto been supposed. On the efferent side the pattern of distribution of motor end-organs in muscles, as well as the distribution of proprioceptor mechanisms, is being systematically studied in relation to patterns of muscular contraction and co-ordination.

Several papers to be presented on the anatomy of the sympathetic nervous system indicate the important information which is still to be gained in this field, both from macroscopical and from microscopical methods of study. The importance of this type of work in relation to the surgery of the autonomic system is quite apparent.

During and since the war extensive investigations on the regeneration of nerve fibres have added very considerably to our knowledge of the factors which retard or favour this process, even if the fundamental nature of axonal growth remains an unresolved mystery. It is this mystery, no doubt, and also current studies on the biophysical basis of the nerve impulse, which have attracted the attention of anatomists more and more to the micro- and ultra-structure of the nerve fibre and its sheaths and the histochemistry of the nerve cell. These studies involve a consideration of some of the most fundamental properties of living protoplasm, and, since these particular properties have been developed to a high degree in nervous tissue, the latter is especially favourable for their elucidation. Let us hope that these penetrating studies may throw light on some of the basic problems of living protoplasm which so far have remained peculiarly elusive.

Histology

The need for a much more exact knowledge of the structure of the neuraxon and its sheaths is now directing

attention to the possible fallacies of histological methods which have commonly been employed in the past for the study of this problem. Indeed, a critical evaluation of these methods has already suggested that some of the appearances of the axon and its supposed variations (particularly at its termination) may after all be the result of artifacts. The increasing use of phase-contrast microscopy for the examination of living cells and tissues now provides an opportunity for overcoming difficulties of this sort. I remember that when, years ago, I saw the first cinematograph film of a cell undergoing mitosis I marvelled that the whole process seemed to take place so precisely as, a century or so ago, the old masters of microscopical anatomy had inferred from their study of fixed and stained preparations. To-day the phase-contrast microscope has likewise confirmed the essential accuracy of many of the observations on cellular anatomy based on fixed and stained preparations, but at the same time it is serving as a vitally important corrective in regard to some of the previous conceptions of the finer details of protoplasmic structure. Apart from problems of this sort, phase-contrast microscopy obviously provides a means for studying in continuity the sequence of changes which occur in the living cell, in a way which has not previously been possible.

The development of new optical methods generally is perhaps the most outstanding feature in the recent progress of histological research. It is well known that the application of the electron microscope to the study of certain cellular elements and cellular derivatives has already led to remarkable advances in our knowledge of biological structure. By way of example, mention may be made here of electron microscope studies of collagenous fibres, cells from tissue cultures, and retinal receptors. The construction of the reflecting microscope is another notable achievement in this field. The advantage of this instrument, as has been made clear, depends on the special facilities which it offers for absorption spectroscopy. The improvement of spectro-photometric techniques is also likely to make possible much more accurate quantitative studies of cellular constituents. Complementary to such improvements in optical methods are the development of more precise and selective histochemical techniques and the use of autoradiography, and it seems probable that within the next few years advances in these directions will throw a good deal of light on the organization of what the biochemists have called the "cyto-skeleton." The application of histochemical methods to cytological studies (qualitative and quantitative) is leading to important observations on the relation of cell structure to function in such organs as the kidney and liver, and in some cases this type of work is also being pursued with success into the nutritional field.

Lastly, mention must be made of the employment of radioactive substances in tracing out the life history of cellular elements whose origin and determination in the living body are still obscure (particularly mobile elements such as the elusive lymphocyte), and in defining the structural basis of the functional cycles of various tissues.

Embryology

In the study of embryology, like that of some of the other branches of anatomical science, there is an increasing tendency to resort to experimental methods—for example, in attempts to solve some of the problems of histogenesis. Not that the descriptive approach is by any means exhausted, for there is evidently still much important information to be gained from the careful study of the anatomy of various stages in the development of embryos as it is displayed statically in serial sections. As is well known, considerable advances have been made in the investigation of the embryology of the higher primates—particularly in reference to the earliest changes which occur in the development of the germ layers. These observations are being paralleled by more detailed studies of early human embryos, the material for which is gradually being accumulated in sufficient quantity to allow of the interpretation of quite closely graded sequences and also to permit some idea of the extent of the individual variations which normally occur in development. The application of more varied staining methods (for example, silver impregnation) has thrown new light on some of the details of histogenesis. The whole field of comparative embryology still offers very considerable scope for the interpretation of developmental processes, as well as for the information which it can yield in problems of taxonomy.

The combined anatomical and physiological approach has, again, provided an impetus of much value in the consideration of the functional significance of various embryonic structures, a matter of obvious importance for the elucidation of the factors which determine developmental abnormalities. The problem of placental permeability, and of its variations at different phases of development, has demanded a renewed and more detailed study of placental structure, and the application of histochemical methods provides the embryologist with a particularly interesting field of research in this direction. The experimental embryologist, with the micromanipulative techniques which he has now elaborated, is in a specially favourable position to undertake functional studies in the early embryo (for example, the details of the cardiac cycle in the earliest stages of the formation of the heart), and the results of several such studies will be reported at this congress.

Experimental Morphogenetics

It is now many years since experimental morphogenetics became established as a special branch of anatomy, but it shows no signs of any waning in vitality. The problem of the organization of the unfertilized germ cell and of the developing ovum is being pursued with histochemical and biochemical techniques, and in the further investigation of the morphogenetic fields and gradients which have been previously established by the embryologist the latter is joining forces with his biochemical colleagues or is himself (at least temporarily) assuming the role of a biochemist. Further developments in the subject of morphogenetics have been marked by the improvement of technical methods of experimental work on the mammalian embryo *in utero* and on the chick embryo in the egg. Already these methods have been applied with success to a variety of problems—for example, the study of the developmental mechanics of the fissuration of the cerebral cortex, and the elucidation of the part which cellular migration plays in the development of certain cell masses in the brain stem. In morphogenetic studies relating to problems of growth, repair, or reconstitution during post-embryonic life much new information has accumulated in relation to skeletal structures. For example, the influence of function or muscular activity on skeletal form is being studied more closely, as well as the hormonal and vitamin factors concerned in the morphogenesis of bone. The evidence that ossification may be induced by the injection of appropriate extracts of cartilage or bone into indifferent tissues is of the greatest interest, particularly since it raises anew the question of the specificity of the osteoblast. This problem of the morphological and functional specificity of cellular elements has also been brought to the fore by the suggestion

that even such a highly specialized element as a striated muscle fibre may in conditions of tissue culture revert to a generalized histiocytic type of cell.

Looking as an outsider on the results of recent studies in experimental morphogenetics, I confess that what I find most intriguing about them is their "will-o'-the-wisp" character. Appearing at first sight to reveal important principles of developmental mechanics not previously suspected, they continually open up still deeper mysteries. This has become especially apparent from the more detailed studies which have lately been made of the functional potentialities of experimentally induced abnormalities. For example, it is one thing to demonstrate that a heterotopically grafted amphibian limb becomes completely innervated from unusual segments of the spinal cord; it is quite another thing to find that the muscles of the supernumerary limb actually function in rhythm with the corresponding muscles of the normal limb. This seems to imply an astonishing degree of reorganization of central connexions in the nervous system. Again, it is one thing to demonstrate that transection of the visual tracts in a newt is followed by regeneration of the fibres; it is another thing to find that the fibres, having become (as it seems) hopelessly entangled at the site of the scar, sort themselves out again so as to re-establish their proper connexions with their original sensory centres in an orderly, systematic manner. This "selective patterning of synaptic connexions" opens up new problems of morphogenesis which are clearly of profound importance.

Endocrinological Anatomy

The contribution of anatomists to the study of endocrinology is made very evident by a consideration of the history of this subject during the last twenty years. It was, of course, an anatomist who first discovered the pituitary growth hormone, and it was another anatomist who first demonstrated the influence of the hormone of the corpus luteum on the endometrium. The hormonal control of many of the tissues of the body has provided great opportunities for the investigation of problems of structural growth and differentiation on a wide scale. Advances in endocrinological anatomy during recent years make it clear that the somewhat empirical approach of injecting crude hormonal extracts just to see what happens is being replaced by much more critical investigations based on more delicate cytological and experimental methods, combined with a better appreciation of the specific relation of hormonal substances to certain types of cellular reaction. Of particular importance in this connexion is the isolation in a relatively pure form of the hormones secreted by the anterior lobe of the pituitary gland, for this now makes possible a much more accurate study of their specific influence on the structure and functions of different tissues and organs.

Probably it is true to say that in the last few years the adrenal cortex has come to occupy first place as the most intensely investigated of all endocrine organs. This is evidently in large part related to the demonstration that extracts of adrenal cortex (e.g., cortisone) may provide the means of alleviating such chronic pathological conditions as rheumatoid arthritis, and to the realization of the role of this organ in physiological reactions of the body after long-continued exposure to stress. The intensive studies which have been stimulated by these observations seem to indicate clearly some correlation between the morphological zonation of the adrenal cortex and specific functions, and this interesting conception is being followed up by a variety of experimental and selective histochemical methods, including studies of the cytogenesis and the mode of vascularization of the different zones. The further demonstration of the close interrelation between the adrenal cortex and the structural organization of other tissues—for example, the lymphoid system—opens up new lines of investigation for the histologist.

In regard to other endocrine organs, reference may be made to the use of radioactive iodine for the study of the metabolic activities of the thyroid gland, and to the application of "alloxan" as a chemical tool for the investigation of the morphology of the islet cells of the pancreas and their relation to function. In the anatomical study of the pituitary body investigations have tended to be concentrated on the details of innervation and vascularization, with particular reference to the hypothalamo–hypophysial interrelationships. The experimental study of the hypophysial portal circulation, involving great technical skill, seems to have settled some of the problems of this interesting vascular connexion which have for many years been the subject of conjecture. Lastly, in the field of endocrinological anatomy an immense amount of work has been completed (and is still being undertaken) on the hormonal control of the development and morphology of the mammary gland—a subject which clearly has most important practical applications.

Physical Anthropology

Physical anthropology, a natural extension of anatomy from the study of the individual to that of the human species as a zoological group, has always occupied a prominent position in anatomical congresses. Much has been done in the past, and is still being done, by physical anthropologists in an attempt to determine the mutual relationships of different racial communities by reference to anthropometrical data, and an enormous quantity of data of this sort has now been accumulated. Further advances in the solution of these problems are to be expected from more detailed studies of the genetic basis of racial differences, from the collection of data on blood groups, and from the application of photogrammetric methods for recording body measurements and physique. The relation of the latter to environmental factors such as nutrition is engaging more attention, and, in connexion with matters of social welfare among native communities, observations are being made on possible racial differences in post-natal growth and development.

Reference may be made to an interesting extension of racial anthropology into the physiological field. There is considerable evidence of a circumstantial kind that some of the more obvious physical differences of race are adaptive in character, but up till recently little attempt has been made to confirm these inferences by experimental tests. Studies in climatic adaptation, which have lately assumed importance in other directions, open an interesting field of investigation in this respect, and already observations are being made in different parts of the world on the relative adaptability of local communities living in varied climatic environments. The importance of more complete anthropometric surveys has also been recognized for practical requirements such as those involved in the design of man-operated machinery, household and school furniture, and so forth. Incidentally, these surveys are likely to provide much useful information for the further analysis of the racial composition of mixed communities in many parts of the world.

The value of anthropometry for the archaeologist is becoming increasingly apparent as the skeletal material of ancient populations accumulates in sufficient quantities for

the application of methods of statistical analysis, and it is clear that as a result much more light is likely to be thrown on the movements of populations in the past. In some cases, it is interesting to note, sufficient remains of ancient communities have been found to permit conclusions regarding the sex and age composition, mortality rate, the expectation of life, and the relation of physique to social grade.

In the field of human and primate palaeontology the past fifteen years have been marked by most remarkable discoveries in many parts of the world—in Europe, South Africa, East Africa, and the Far East. In Europe the discovery of well-authenticated skulls of pre-Mousterian date raises anew the problem of the position in human evolution of Neanderthal man; in South Africa the great quantity of Australopithecine material found in limestone deposits near Johannesburg and elsewhere now provides an opportunity for a correct assessment of the affinities of these extinct ape-like creatures; in East Africa the discovery of an astonishing variety of Early Miocene apes of a generalized type (including a skull and a number of limb bones) has added very considerably to our knowledge of the earlier stages of hominoid evolution; and in the Far East the further discovery in Java of many more remains of *Pithecanthropus* and allied forms of early man (much of it still in course of publication) appears to indicate that the evolutionary radiations of primitive hominids showed a much greater diversity than had previously been suspected.

Considering their novelty, it is not surprising, of course, that such remarkable discoveries should have given rise to a certain amount of controversy, but in general this controversy has been concerned with details of interpretation rather than with main issues. I confess to a considerable amount of sympathy for those energetic field workers who, in remote parts of the world, have shown such initiative in their search for the remains of early man and other fossil primates. For, having by their own strenuous efforts made available for scientific study all this valuable material, they sometimes have patiently to look on while laboratory scientists (like myself) dispute among themselves on the precise value of specimens which they themselves may never even have seen. It is rather like throwing bones into a den of lions and watching the inevitable squabbles which ensue—an entertaining spectacle in some cases, no doubt, but also one which may tend after a time to become a little irksome. As a matter of fact, if the history of palaeoanthropology is reviewed it is astonishing to find how often the original interpretations of obscure fossil remains turn out to be broadly correct. No anthropologist to-day, I think, gives serious consideration to the criticism that *Pithecanthropus* was nothing more than a giant gibbon, or that the remains of Neanderthal man found at Düsseldorf were only those of an idiot or an acromegalic. Even the original interpretation of Piltdown man has now received unexpectedly strong support from the fluorine analysis of the jaw and skull fragments. Special mention should be made of this method of estimating the comparative antiquity of fossil remains found together in the same deposit. It has already been applied with success to some of the fossils of uncertain date which have been the subject of much debate in the past, and it will certainly be applied as a routine test to similar problems as they arise in the future.

Conclusion

This short review of the progress and trends evident in anatomical science to-day, I should like again to emphasize, is no more than a personal impression. It is not, of course, based on a detailed study of all the relevant literature; it is simply the casual survey of one individual who, preoccupied with his own particular field of studies, gleans scattered pieces of information here and there from discussions with his colleagues or from all-too-hurried glances at the contents of papers and journals. For this reason, also, it has perhaps tended to make too much use of illustrative examples near at hand. You will therefore find many gaps in the review—some of which you may feel to be rather glaring. But at least it may serve to show how very active are the numerous branches of our science and how many problems of paramount importance are now engaging the attention of anatomists. And, even if I have not made this fully apparent, the programme of communications at this international congress in Oxford can hardly fail to do so.

AMOEBIASIS IN GREAT BRITAIN
WITH SPECIAL REFERENCE TO CARRIERS*

BY

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The recent war has left an aftermath of medical problems arising directly from the fact that large bodies of men returning to Great Britain have been exposed to exotic diseases in tropical and subtropical regions. As a result the medical authorities are concerned about the possibility of the introduction and spread of protozoal diseases among the local inhabitants.

I propose to restrict myself to a consideration of infections due to *Entamoeba histolytica* among the population of Great Britain. The problem of amoebiasis in this country is more complicated than that of other protozoal diseases owing to the cosmopolitan distribution of *E. histolytica*, on account of which infection with this parasite can hardly be described as a merely tropical disease.

The medical practitioner is apt to encounter cases of amoebic infection of different types—some with typical clinical symptoms, others with non-characteristic manifestations, and others again without any symptoms whatever. While in cases of overt amoebiasis there can be no doubt about the necessity for specific treatment, opinions regarding the policy to be adopted towards apparently healthy "cyst-passers" are divided. This is due to conflicting views on the aetiology, host–parasite relations, and pathogenesis of amoebiasis. Although much research has been devoted to these questions, the results are inconclusive, and most physicians are influenced in their choice of a practical policy either by personal preference for some particular hypothesis or by expediency. The problem of amoebiasis in this country can be best appreciated from a review of the present state of our knowledge of the subject.

Incidence of Infection

Investigations carried out in the last 35 years have demonstrated that *E. histolytica* has a world-wide distribution and that the incidence of infection with this parasite may be as high in countries with a temperate climate as in those with a tropical climate. It has also been established that the majority of infected persons everywhere are carriers

*Read in opening a discussion in the Section of Tropical Medicine at the Annual Meeting of the British Medical Association, Liverpool, 1950.

without any symptoms of disease. As regards clinical cases (amoebic dysentery, etc.), these are common in warm countries lying between latitudes 40° N. and 30° S., but are exceptional among the indigenous populations of temperate regions. Cases of amoebiasis in Great Britain will therefore comprise, on the one hand, persons whose infection is of local origin, and, on the other hand, those who have acquired their infection abroad.

During and shortly after the 1914–18 war single stool examinations of more than 3,000 persons, who had never been abroad, resulted in the detection of *E. histolytica* in about 3.4%. Since one faecal specimen reveals less than one-third of the infections, it has been estimated that the actual incidence of infection was from 7 to 10% of the general population (Dobell, 1921; Dobell and Harvey, 1923). In a similar examination made after the 1939–45 war by Morton *et al.* (1950) an examination of three stool specimens of 1,000 young R.A.F. apprentices, who had never been abroad, revealed the presence of *E. histolytica* in 1.6%. Though the sample—representing a total of 4,000 persons—is small in relation to the population as a whole, it is fairly representative, and indicates that probably between one and four million of the inhabitants of these islands are infected with the "dysentery amoeba."

The most important feature of these indigenous cases of amoebic infection is that they are to all intents and purposes normal and healthy persons who are symptomless carriers of the parasite, the presence of which is usually revealed only when their cysts are passed in the stools, hence the designation "cyst-passers." It is now generally accepted that most persons infected with *E. histolytica* throughout the world are carriers, and the incidence of infection in various countries and different climates is comparable to the figures reported for Great Britain. A Russian worker, Gnezdilov (1947), reckons that the average global incidence of symptomless carriers of amoebiasis is about 20%.

In considering the occurrence of amoebiasis in Great Britain we must also take into account cases introduced from abroad. While in a maritime country like ours opportunities for the introduction of individual cases are always present, they multiply considerably as the result of wars. The available figures for imported cases are all based on the examination of troops returning from overseas. Thus during the 1914–18 war the incidence of amoebic infection among men invalided for dysenteric complaints was from 18 to 25%, while among the non-dysenteric cases it was from 12 to 15% (Dobell and Harvey, 1923). Later, in the course of routine examination of R.A.F. personnel, Whittingham (1923) found 10% harbouring *E. histolytica*. A similar investigation was carried out recently by Rickards (1949) on 2,000 men of the R.A.F. after their disembarkation from the Mediterranean and Indian areas. Single stool examinations revealed *E. histolytica* in 3.47% and 7.33% respectively, but it was estimated that the true incidence of infection was from 10.4 to 36.6%.

Although the majority of cases of clinical amoebiasis among the troops underwent a course of treatment, many carriers returning to civil life must have escaped detection and contributed to the contamination of the resident population, about 10% of whom are already carriers of *E. histolytica*. Among the carriers in Britain one is therefore likely to encounter the following three types, which—in the absence of clinical signs—may be indistinguishable: chronic cases in the latent phase, convalescents, and contacts. However, chronic cases and convalescent carriers are liable to relapse, and can then be dealt with by appropriate treatment. But contact carriers—who are the great majority—are in a different category, and the attitude adopted in their case depends on the view held regarding their host–parasite relations.

Host–Parasite Relations

Though at present nobody will deny the existence of symptomless carriers of *E. histolytica*, their danger—as a source of disease in others—has not been fully elucidated, but it is well known that, in spite of the presence in this country of upwards of a million individuals harbouring this parasite, the number of clinical cases of amoebiasis is negligible. The significance of carriers can be properly appreciated only from a knowledge of the available facts and their interpretation, which can now be considered.

Most clinicians and many parasitologists in this country and in America (for example, Dobell, 1919; Faust, 1941; Craig and Faust, 1945) regard *E. histolytica* as an obligatory tissue-parasite which invariably invades the gut wall, producing the characteristic gross or minute lesions and feeding on red blood corpuscles. While admitting the occurrence of a large proportion of carriers, they deny the very existence of *healthy* symptomless cases among them, believing that lesions, however minute, are present in all carriers. However, many other observers—chiefly on the Continent—believe that in carriers, especially of the contact type, amoebic infection is not necessarily accompanied by pathological changes, the parasites in most cases living as commensals in the lumen of the intestine, where they feed on bacteria and other faecal contents. During the last quarter of a century this conception—first enunciated in Holland by Kuenen and Swellengrebel in 1913—has been steadily gaining support until it now rests on a solid foundation (cf. Hoare, 1949b).

The commensal habits of *E. histolytica*, which have been established beyond all doubt *in vitro* since the discovery of suitable culture media in 1925, were later fully confirmed *in vivo* in experimental infections of monkeys (Dobell, 1931) and rats (Neal, 1948). The mode of life of this amoeba in human carriers does not readily lend itself to direct observation, but in the past a number of observers have described and depicted the ingestion of micro-organisms by *E. histolytica* recovered from human cases. I have personally studied material from symptomless carriers and patients suffering from chronic amoebiasis, and have satisfied myself—and demonstrated to others—that the amoebae from such persons contain food-vacuoles enclosing bacteria, which had obviously been ingested from matter in the lumen of the gut (Hoare, 1947, 1949a). Further proof of the commensal existence of *E. histolytica* in the lumen is provided by direct examination of the intestinal wall in symptomless carriers. Thus Morton *et al.* (1950), who performed sigmoidoscopy on such cases, found that the mucosa was perfectly normal, while Acton (1933) made careful post-mortem examinations of several cases without detecting any signs of ulceration.

There is also a considerable amount of circumstantial evidence that *E. histolytica* may live as a commensal. Thus the number of non-haematophagous amoebae and cysts discharged by carriers may reach 350,000 per gramme of faeces, or 35 million daily, and it is inconceivable that such enormous masses of amoebae could be living in the gut-wall without producing any intestinal disorder. Another clue is provided by the administration of purgatives: this is followed by the discharge of numerous amoebae, but on succeeding days there is a marked fall in the number of cysts found in the stools. This diminution would not have taken place if the amoebae were derived from ulcers,

unless it is assumed that the purgative causes them to emerge into the lumen, which is highly improbable (Reichenow, 1931).

An interesting investigation on this question was carried out by Andrews and Atchley (1932), who argued that if all the amoebae resided in tissues haemorrhage would occur in a high proportion of cases, but if they were lumen-dwellers bleeding would not necessarily result. Using the benzidine test for occult blood, they examined the stools of symptomless carriers without detecting any traces of blood in them, and concluded that *E. histolytica* is not an obligatory tissue-parasite, but that in the great majority of carriers it lives in the lumen of the gut. They also remarked that if the vast numbers of cysts evacuated daily in these cases originated from amoebae in the tissues it would be necessary to assume that millions of parasites can be expelled daily from the bowel without loss of detectable amounts of blood.

From these observations it is evident that the recognition of a commensal phase in the life-history of *E. histolytica* is fully justified. However, the bias against this view is still very strong. Thus, Faust (1941) examined the intestines of 202 individuals who had died of accidents in New Orleans, and found that 13 harboured *E. histolytica*. Though only seven of them showed superficial lesions of the mucosa, Faust assumed that undetected lesions must have been present in the other six as well. However, the only logical conclusion from these findings is that in about 50% of the carriers observed by him the amoebae were actually living in the lumen *in the absence* of any gut lesions (Hoare, 1947). As regards the minute lesions detected in the other cases, it is highly probable that they represented superficial necrotic changes of the mucous membrane which commonly develop after death (Reichenow, 1931 ; Napier, 1947).

In the light of our present knowledge the host–parasite relations in amoebiasis can be summarized as follows: although *E. histolytica* is a pathogenic parasite, capable of invading the tissues of its host with the production of lesions and clinical symptoms of disease, in most cases it does not manifest any evidence of virulence, for in up to 90% of persons harbouring this parasite the infection is symptomless and the host is a carrier. In most carriers the amoebae live in the lumen of the gut as harmless commensals and represent the only stage capable of producing cysts, which serve to propagate the infection to new hosts. But under certain conditions the lumen-dwelling amoebae may reveal their virulence and invade the intestinal wall, giving rise to the typical symptoms of amoebiasis (Hoare, 1949b).

Pathogenesis

The factors which determine the virulence of *E. histolytica* are not clearly understood. Though some workers (Kuenen and Swellengrebel, 1913 ; Adams, 1945 ; Wenyon, 1947 ; Murgatroyd, 1947) believe that a carrier may at any time develop clinical symptoms, it is generally admitted that this rarely occurs in countries with a temperate climate. To account for this, it has been suggested that there are races or strains of *E. histolytica* differing in the degree of their pathogenicity. Among such races there are two which differ in size (Gnezdilov, 1934 ; Sapero *et al.*, 1942 ; Hoare, 1945): a large one with cysts having a mean diameter of 11–12 μ, and a small race with cysts measuring 7–8 μ in diameter. In practice a diameter of 10 μ can be taken as a dividing-line between the two races.

It has been found that in the United States (Sapero *et al.*, 1942) and in Great Britain (Morton *et al.*, 1950) at least 50% of the symptomless carriers harboured the small race. The large race corresponds to the conventional *E. histolytica*, which is the pathogenic form causing amoebic dysentery and other symptoms of amoebiasis. As regards the small race, which is sometimes described as *E. hartmanni*, from the available evidence it would seem that the small amoebae do not ingest erythrocytes and do not produce dysenteric symptoms in experimentally infected cats, while Morton *et al.* (1950) found that rats were refractory to infection with this race. There is also a general consensus of opinion that in human infections clinical symptoms are never associated with the presence of amoebae of the small race, which is therefore not pathogenic.

While most workers now agree that the small race of *E. histolytica* is quite harmless to man, opinions regarding the existence of physiologically distinct strains within the large race are divided. An extreme view is that held during the last 25 years by Brumpt (1949), who recognizes two morphologically indistinguishable strains of the large race. One (which he separates as a distinct species, *E. dispar*) is regarded as being non-pathogenic and responsible for infections in symptomless carriers throughout the world ; the other (*E. dysenteriae* or *E. histolytica sensu stricto*), which is said to be restricted to warm countries, is the pathogenic form causing amoebic dysentery primarily in endemic areas and secondarily in countries with a temperate climate, when introduced by carriers returning from the Tropics.

Apart from the unnecessary splitting of *E. histolytica* into two species, it is difficult to admit the existence of a non-pathogenic race of this amoeba, when it is known to be potentially pathogenic even while its virulence for man is not manifested. Thus it has been demonstrated that strains from diverse sources—including carriers in countries with a temperate climate—are capable of producing ulceration of the gut in experimentally infected animals (Matevossian *et al.*, 1941 ; Frye and Shaffer, 1948 ; and others), but it is noteworthy that some observers (Morton *et al.*, 1950 ; Neal—personal communication) have found that British strains from indigenous carriers were less virulent for rats than strains from overseas.

From these observations it is evident that Brumpt's views cannot be accepted unreservedly, but it is conceivable, as already suggested by Dobell (1921), that in different parts of the world there are various physiological strains of *E. histolytica*. These strains not only are probably specially adapted to the local inhabitants but also differ in the degree of their pathogenicity. The strains in countries with a temperate climate, like England, would seem to be much less virulent than strains in warm countries, and are usually harmless to their hosts, who are symptomless carriers. It is therefore possible that clinical cases of amoebiasis in this country are almost if not entirely due to imported virulent strains of *E. histolytica*.

Similar views have been expressed by some foreign workers. Thus, Westphal (1937b) found that in Germany cases of amoebic dysentery were restricted to the Baltic ports, whereas in the interior of the country only symptomless carriers occurred ; and Sluiter (1948) believes that all cases of amoebic dysentery in Holland are of Indonesian origin. The number of cases of clinical amoebiasis reported in Great Britain among persons who had never been abroad has always been insignificant, the total not exceeding three dozen. Among those recorded recently, in some instances (Morton *et al.*, 1950) there was direct proof of contact with patients suffering from amoebiasis contracted overseas, while in others, reported from Liverpool (Adams and Seaton, 1949), there was strong circumstantial evidence of contact with extraneous sources of infection.

However, we are still in ignorance regarding all the factors governing the pathogenesis of *E. histolytica*, though a number of hypotheses have been advanced. According to some investigators (Walker and Sellards, 1913) the course of infection depends mainly upon variations in the susceptibility of the human host. From this point of view the greater severity of the disease among Europeans in hot countries is attributable to lower resistance due to an unfavourable climate, unsuitable diet, and similar causes (Hoare, 1949b). Other observers (Westphal, 1937a ; Deschiens, 1938) believe that the development of amoebic dysentery is due to the association of the parasite with pathogenic bacteria—especially dysentery bacilli (Westphal, 1948)—which are the first to damage the intestinal wall, thereby exposing it to invasion by the amoebae. Recent observations have shown that bacterial infections are responsible for at least some complicating symptoms in amoebic dysentery (Hargreaves, 1945). It is possible that any or all of the factors mentioned (races differing in virulence, host-resistance, climate, synergic action of bacteria) may influence the course of amoebic infection.

Conclusions

From the data at our disposal it is evident that the incidence of amoebic infection in the native inhabitants of Britain has remained relatively stationary during the last 35 years and has not been significantly influenced by the two intervening world wars. This is also the conclusion arrived at by the Amoebiasis Panel in the United States (Wright, 1950 ; Lincicome *et al.*, 1950). Practically all the cases encountered in this country are symptomless carriers. One-half of them harbour the non-pathogenic small race of *E. histolytica*, while the other half are infected with the potentially pathogenic large race, the local strain of which seems to be comparatively harmless to its hosts. It is conceivable that the isolated cases of amoebic dysentery occurring from time to time among the native residents may be due to contamination with more virulent imported strains of this parasite. It would seem, therefore, that on the whole the local inhabitants have a high degree of tolerance to infection with *E. histolytica*, which is only occasionally broken down when virulent exotic strains are introduced into the country. But even these are apparently unable to establish themselves permanently in the community, probably owing to the absence in the host-environment of conditions favouring the maintenance of the parasite's virulence.

It must be admitted, however, that there is no absolute proof that *E. histolytica* in this country is invariably innocuous, though the experience of many years indicates that the prevalence among the indigenous population of amoebic carriers need not be regarded with alarm. Nevertheless, as there is an element of doubt, it would be rational, as some clinicians advocate (Adams, 1945 ; Murgatroyd, 1947 ; Napier, 1947), to treat all cases in which infection with *E. histolytica* has been diagnosed, though infections with the small race of this amoeba can be safely ignored. However, since it is impossible to detect and treat the many thousands of carriers present in this country, in actual practice they are usually left alone and only cases which develop clinical symptoms undergo treatment. As past experience has shown that amoebic carriers in a temperate country are of no danger to the community, some workers (Dobell, 1921 ; Gnezdilov, 1947 ; Bach, 1949) even prefer to adopt this course as a practical policy. The problem of carriers thus resolves itself into a question of expediency.

Whatever views may be held regarding the measures to be taken against them, the presence in our midst of thousands of amoebic carriers has an important bearing on public health, which the late Clifford Dobell (1921)—who was noted for plain speaking—expressed as follows: "When we find persons infected with intestinal protozoa we must conclude that they have previously swallowed particles of the fairly fresh and damp excrement of other persons ; and when we find many people presenting such evidence of pollution we can only conclude that the disposal of human faeces has not yet been brought generally to that pitch of perfection which seems desirable. . . . It is clear that . . . we still have much to learn about individual and communal hygiene."

I wish to express my gratitude to Air Vice-Marshal T. C. Morton and Dr. R. A. Neal for permission to consult and quote from their papers while these were still in the press.

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Among administrative changes made in the provision of medical and surgical appliances the following is announced by the Ministry of Health. When a hospital specialist recommends the provision or renewal of surgical footwear he may, if satisfied that the case has reached stability, advise that the supply of such footwear in accordance with the prescription may continue up to five years without further medical examination. This should be stated on the patient's hospital record, and the Appliance Order Form No. 2 should be endorsed "stabilized for (so many) years." In these cases the Ministry of Pensions will renew the footwear provided that the patient is satisfied with the previous pair. If a change of contractor is necessary, the Ministry of Pensions will refer the patient back to the hospital specialist. At the end of the specified period the Ministry of Pensions will refer these cases to the hospital specialist, who may again advise renewal.

EXPERIMENTAL BURN STUDIES

INCLUDING TREATMENT WITH CORTISONE-ACTIVE MATERIAL EXTRACTED FROM URINE*

BY

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During the past few years improved therapy has resulted in a considerable reduction in the mortality from extensive thermal burns. This improvement has been reflected in all the clinical stages through which a severe burn passes; improvement, however, has been least satisfactory in the so-called toxic phase.

These facts are well illustrated in the data shown in Table I, abbreviated from the report of Farmer (1943), in

TABLE I.—*Analysis of 1,797 Cases of Burns, Hospital for Sick Children, Toronto*

Year	No. Cases	Total Mortality	Deaths				Average Day of Death*
			Shock	Toxic	Sepsis	Others	
1913–24 ..	412	35%	28%	53%	18%		1·7
1925–8 ..	230	16%	13%	40%	46%		3·4
1929–37 ..	782	11%	7%	70%	21%	2%	3·8
1938–41 ..	373	3%	0	82%	9%	9%	5·0

* 10 days and under.

which an analysis is made of 1,797 burns at the Hospital for Sick Children, Toronto, from 1913 to 1941. The table summarizes the deaths occurring within 10 days after the accident.

It will be noted that the group included under "shock" (Table I) shows the greatest improvement under modern treatment. This phase includes the clinical findings associated with a reduction in circulating blood volume, and the improvement is largely due to correction of this condition by adequate intravenous replacement therapy. Deaths from this cause are most apt to occur within the first 48 hours.

The "sepsis" group has also shown a reduction in mortality following improved local treatment and the use of chemotherapeutic agents. Included in this group are those cases which usually showed a swinging fever associated with clinical and bacteriological evidence of invasive infection of the burn-surface with or without bacteriaemia or septicaemia. Death in this group is apt to be late. Under the so-called "toxic" group are included the patients who died despite initial improvement following shock treatment and who showed no obvious evidence of infection.

These changes in the problem presented by extensive burns are well reflected in the changes in the length of the survival time before fatal termination, as shown in Table I. It will be seen that the average survival time before death at present falls within the so-called toxic time-interval. There is no known effective treatment for this condition, and spontaneous recovery or death between the third and tenth days occurs despite symptomatic measures. It is here that little reduction in morbidity and mortality has been obtained, although better knowledge of fluid and electrolyte balance and control of shock has inevitably lessened the mortality from this second phase of the burn illness. Nevertheless, it is now the greatest single factor in burn mortality.

*This work was carried out with a grant-in-aid supplied through the Defence Research Board of Canada.

Need for New Approaches

It thus became apparent that, no matter how excellent the shock therapy, and no matter how well the surface lesion has been treated in burns involving a considerable part of the body, the illness remains relatively unaffected by any such treatment. There is thus need for new approaches to the problem. With the recent increase in knowledge of the part played by adrenal physiology in combating stress, the striking parallelism between the physiological changes following burns and the physiological effects of A.C.T.H. and cortisone suggested that a relationship might exist between the defence response to the burn trauma and the action of these substances. The evidence for this is summarized in Table II.

TABLE II.—*Comparison of the Effects of Administration of A.C.T.H., Cortisone, and the Metabolic Upset Following Burns*

	A.C.T.H.	Cortisone	Burns
Nitrogen balance	Negative	Negative	Negative
17-ketosteroid excretion	Increased	Decreased followed by slight increase	Increased
Carbohydrate metabolism	Hyperglycaemia	Hyperglycaemia	Hyperglycaemia early
Sodium balance	Retention followed by excretion	Retention followed by excretion	Blood sodium drops slightly
Chloride balance	Retention followed by excretion	Retention followed by excretion	Excretion suppressed early with decrease in blood. Negative balance later
Potassium balance	Negative	Negative	Variable
Eosinophils	Reduced	Reduced	Reduced
Ascorbic acid levels	Amount in cortex reduced		Decrease in blood and excretion
Adrenal gland changes	Hypertrophy of cortex with depletion of lipoid	Atrophy of cortex with depression of function	Hypertrophy of cortex with depletion of lipoid

A negative nitrogen balance has been shown by Long *et al.* (1940), Ingle (1949), and Sprague *et al.* (1950) to occur after the administration of A.C.T.H. and corticosteroids of the C11 oxygenated type. It has also been shown by such authors as Cope *et al.* (1943), Levenson *et al.* (1945), and Hirshfeld *et al.* (1945) that negative nitrogen balance is a feature of the burn illness. That this nitrogen loss differs somewhat from that following other forms of stress is apparent when one considers the amount of dead tissue resulting from the burn that must be handled in some fashion. Abbott *et al.* (1946) found that the negative balance in burns was very resistant to correction by dietary means. It is interesting also to note that Sellers and You (1950) showed that deoxycortone acetate administration to burned adrenalectomized rats decreased significantly the nitrogen loss without producing marked rises in the blood N.P.N.

Sprague *et al.* (1950) reported marked increase in the 17-ketosteroid excretion in the urine after the administration of A.C.T.H. The opposite was shown to occur following cortisone administration, which suggests a depression of this cortical function when this substance is given. Cope *et al.* (1943) studied 17-ketosteroid excretion after burns and showed that there was an increased excretion for three to seven days following the burn, after which excretion dropped to normal levels or below, remaining at these levels usually until the burn was healed.

Long *et al.* (1940) demonstrated that hyperglycaemia can be induced in intact rats by the C11 oxygenated steroids when the animals are force-fed high carbohydrate diets. Changes in the glucose-tolerance curves in humans

following the administration of A.C.T.H. or cortisone were described by Sprague *et al.* (1950). Derangement of carbohydrate metabolism, as evidenced by early hyperglycaemia, has been found after burns by such workers as Cope *et al.* (1943), Douglas (1944), and Taylor *et al.* (1944). Douglas (1944) also found that this early response was replaced later by a marked hypoglycaemia, and two of his patients required glucose therapy for hypoglycaemic reactions. Death followed in one of these cases despite temporary rises in blood sugar. This may be an indication of adrenal exhaustion.

It is noted further that there is some similarity between the electrolyte changes after the administration of A.C.T.H. and cortisone, and the alterations found following burns. However, the changes after a burn are never very marked and are usually easy to correct. Rhoads *et al.* (1941) noted increased blood chloride levels in burns following the administration of D.O.C.A., and Wilson and Stewart (1939) found that blood sodium levels rose in a similar fashion.

Of more interest is the reduction in eosinophils present in each condition. That this occurs after the administration of A.C.T.H. to humans with intact adrenals was well demonstrated by Hills *et al.* (1948). Schreiner and Pucsko (1925) first recorded this observation following burns, and noted that the disappearance of eosinophils from the blood stream was a bad prognostic sign. Reappearance was noted during the recovery phase.

Present Investigation

In our own studies we have used the method of Dunger (Thorn *et al.*, 1948), as modified by Miss C. Jackson, of the Hospital for Sick Children, Toronto, for counting the cells. This modification consists in using a solution composed of 5% eosin 5 ml., acetone 7 ml., 40% formaldehyde 3 ml., water to 100 ml.; it has been adopted because it largely removes the necessity for carrying out the count immediately upon obtaining the sample and gives better staining of the eosinophilic granules.

Our findings to date indicate a similar change to that reported by Schreiner and Pucsko. One child with a 40% third-degree burn, dying 36 hours after injury, has shown a complete disappearance of eosinophils from the blood within 24 hours. A second child with 6% second-degree burns showed a reduction to 37 cells per c.mm. A third child with 6% second-degree burns showed no striking change.

Ascorbic acid levels in the blood were shown by Abbott *et al.* (1946) to fall rapidly after burns, and Andreae and Browne (1946) recorded similar observations. On the hypothesis that the ascorbic acid was used up in the reduction of possible toxic oxidation products from the burn, thereby acting as a detoxifying agent, replacement therapy was studied by Clute, Farmer, and Franks (Brown *et al.*, 1948). We found that serum ascorbic acid levels could be raised to normal and above by either local or systemic administration of ascorbic acid. Despite such adequate levels, it was our experience that little clinical benefit was obtained during the so-called toxic phase, and, indeed, two patients died in this period with ascorbic acid levels well restored. It has been shown by Sayers and Sayers (1949) that the administration of A.C.T.H. produces a marked reduction in the ascorbic acid content of the adrenal cortex. Thus, while decreased blood levels *per se* may be of no clinical significance, they may be an index of increased A.C.T.H. activity in response to increased stress.

Sayers and Sayers (1949) have also shown that the giving of A.C.T.H. causes a marked depletion of the sudanophilic substance of the adrenal cortex. Adrenal changes following stress were shown by Greep and Deane (1949) to be most marked in the zona fasciculata and reticularis, with lesser changes in the glomerulosa. Hypertrophy of the cortex accompanies this change (Sayers and Sayers, 1949). Pursuing the burn parallel further, hypertrophy of the adrenals is a not uncommon pathological finding in fatal burns, and focal exhaustion of lipoids has been described by Douglas (1944). Hirota (1934) described early increase in thickness of the zona fasciculata and reticularis following this injury. Fig. 1 shows the adrenal gland of a child

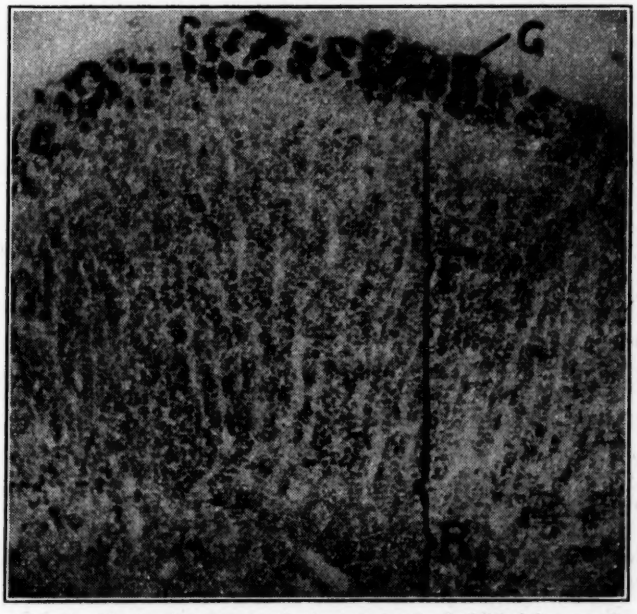

FIG. 1.—Photomicrograph of adrenal gland of child dying on the tenth day following a severe burn. Stained with Sudan IV and counterstained. Note the loss of lipoid from the zona fasciculata (F) and reticularis (R), with little change in the zona glomerulosa (G).

from our series dying on the tenth day after a 35% second-degree burn. This section, stained with Sudan IV for fat and counterstained with haematoxylin as a nuclear stain and light green for cytoplasm, illustrates well the loss of lipoid from the zona fasciculata and zona reticularis, with relatively little alteration in the lipoid content of the zona glomerulosa. This finding would strongly indicate that an exhausting demand has been placed on the adrenal cortex as a result of the burn injury, which proved fatal.

Experiments on Mice

If this exhaustion of cortical hormone production plays a part in the clinical course of the disease, then the administration of active cortisone (in contrast to trophic hormone —A.C.T.H.) might justifiably be considered in the therapy of severe burns. With this in mind, an experimental investigation has been carried out with thermal burns in mice to test the effect of administering cortisone-active extracts. Mice have been used because they were well suited for the planning of the experiment and the amount of active cortisone material was limited.

Adult white male mice weighing between 20 and 25 g. were used throughout. The mice were anaesthetized with intraperitoneal pentobarbitone sodium ("nembutal"), giving on the average 1 mg. of the drug. The animals were suspended, back downwards, from a balance, and counterweighted to within 65 to 75% of their body weight.

They were then immersed in water at 70° C. to a depth sufficient to restore balance, and held there for 15 seconds. The mice were thus burned over a surface covering 30% of their body weight. This method gave a constant fractional burn for each animal.

Since it has been shown that the administration of plasma can largely eliminate shock as a cause of death, all the treated animals were given intravenously a solution of pooled human serum albumin in distilled water as soon as possible after the burn. The material was diluted to form a 12.5 or 6.25% solution, and the mice received on the average 0.5 ml. of the albumin solution over a period of one hour. This is equivalent in amount to about 25% of their blood volume. In this fashion we have attempted to study the conditions obtained in a severely burned patient in whom shock has been controlled, thus simulating the current clinical problem with the exception that no attempt was made to treat the lesion locally. Follow-up of the animals showed that this method produced mixed second- and third-degree burns of approximately 30% surface area. By way of control on the intravenous therapy alone, a further group of animals was left without any treatment whatever following the trauma.

Cortisone-active material was obtained from pooled human adult male day urine, extracted by a modification of the method used by Venning *et al.* (1946) for the bioassay of glycogenic corticoids. For administration to the animals the dried extract obtained routinely from four-litre samples of urine was taken up in 0.3 ml. of absolute alcohol, to which were added 1.5 ml. of sterile 10% glucose (obtained by filtering through a Seitz filter) and 1.2 ml. of sterile distilled water. This gave 3 ml. of a variable light-brown emulsion for each four-litre urine residue.

To test the effect, half of the animals receiving the intravenous therapy were injected twice daily, subcutaneously, with 0.5 ml. of this emulsion in an area remote from the burn. Venning and Browne (1949) demonstrated that the average human male 24-hour excretion of urine contained approximately 60 glycogenic units of corticosteroids—one glycogenic unit being defined as the amount of material causing a deposit of liver glycogen similar to that deposited by 1 μg. of cortisone (compound E of Kendall). Computing from these figures of Venning, it follows that each burned animal received about 40 glycogenic units of cortisone-equivalent material daily. Treatment was carried on for four days after the burn. This dosage and time was chosen as representing a known biologically active amount of hormone for the mouse, given over a period when the so-called toxic effects were judged to be most likely to occur. Likewise, the intravenously treated control mice were given twice-daily injections of 0.5 ml. of an aqueous solution of 5% glucose and 10% alcohol over a similar period.

Results

The results of the study of 41 untreated control mice and 69 animals treated with intravenous shock therapy alone, as compared with the results from 69 mice given the above cortisone treatment plus intravenous shock therapy, are shown in Fig. 2. It will be seen that the administration of cortisone-active material has markedly reduced the burn mortality in the mice which, in addition, receive intravenous therapy for shock. This reduction is pronounced even in comparison with the group receiving the shock therapy alone. The probabilities of the significance of the difference in death rates found between the latter two groups are plotted against days after the burn, as shown in Fig. 3. It will be seen that a significant difference ($P<0.05$) is established in the findings throughout the experiment. The improvement in death rate becomes highly significant ($P<0.02$) between one and seven days after the burn despite the lack of local treatment of the lesion.

It will be noted also from Fig. 2 that, as was to be expected, the intravenous therapy alone has reduced the

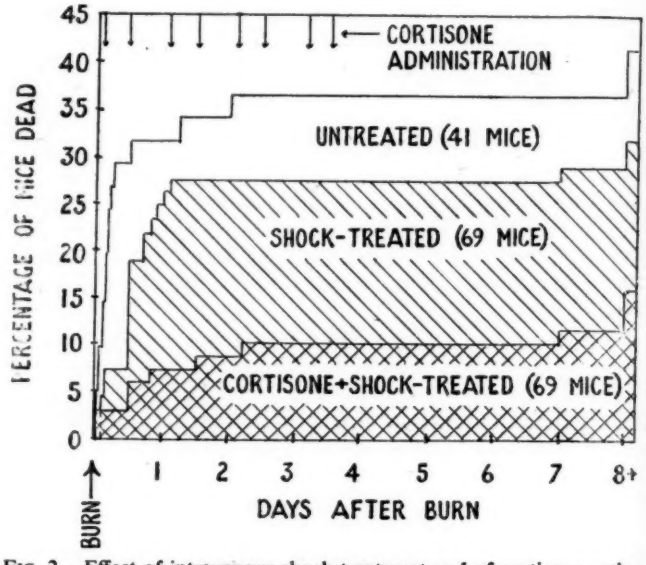

FIG. 2.—Effect of intravenous shock treatment and of cortisone-active extract on mortality following thermal burns in mice.

mortality considerably as compared with the untreated controls. In addition the graph shows that the shock therapy resulted in a longer period of survival following the burn in those animals which eventually succumbed. These experimental findings with the mice parallel the clinical results following shock therapy as shown in Table I.

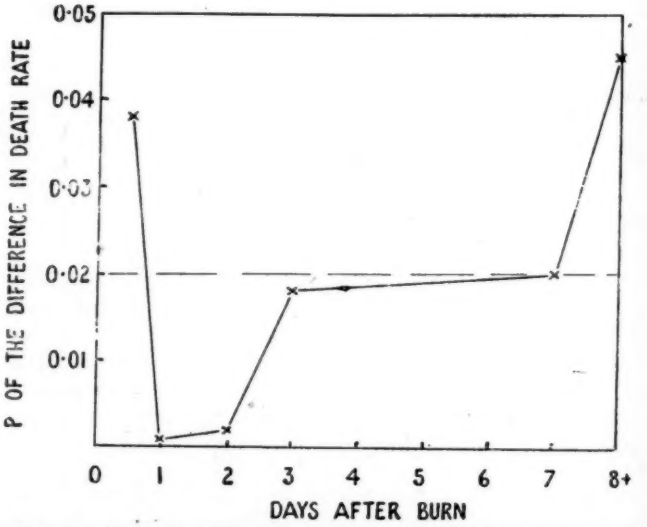

FIG. 3.—P of the difference plotted against time after burn of cortisone-plus-shock-treated mice as compared with shock treatment alone.

The experimental study thus accurately reflects the clinical experience in these respects. An examination of the actual times of death following the experimental burn shows that, of those animals dying under seven days, the average survival time of the lethal cases for the untreated controls was eight hours; for the shock-treated group it was 12 hours, and for the cortisone-plus-shock-treated it

was 19 hours. It will be seen that this interval shows a lengthening as a result of the shock therapy, yet this increased survival time was increased still further as a result of the cortisone-active material. It should be noted that among the seven deaths occurring before seven days with the cortisone-treated group are included two animals which died within ten minutes of the burn, before intravenous therapy was completed. If these are omitted the results become even more striking.

The locally untreated burn lesions went on to sloughing and ulceration. It is considered that the deaths after seven days following the burn largely resulted from the untreated lesion and therefore do not constitute part of the present study.

That the cortisone effect was exerted on the toxic phase rather than on the shock period cannot be dogmatically stated, yet it is significant to note that after the intravenous therapy the animals appeared relatively normal for a while, and would later become inactive and die. The further reduction in the death rate of the shock-treated animals resulting from the additional treatment with the cortisone-active material, coupled with a further increase in the survival time of the lethal cases in this group, may be interpreted as evidence beyond what might possibly be expected if the effect was on the shock mechanism alone. In this connexion the reputed antihistaminic action of cortisone may be of interest.

There is thus evidence that the administration of urinary extracts known to contain cortisone-active fractions has a beneficial effect in reducing mortality of experimentally burned mice. This would seem to indicate that it would be justifiable to give cortisone to clinical burns from which death might be anticipated during the so-called toxic phase.

In the present study, evidence of thinning of the epidermis and atrophy of sebaceous glands, as stated by Li (1950) to occur with A.C.T.H. administration, was not sought by microscopical examination. However, the purple striae and thinning of the epidermis noted by Sprague *et al.* (1950) with excess cortisone administration were not found in the cortisone-plus-shock-treated animals; nor was there any gross evidence that this treated group developed proportionately greater areas of third-degree burn or showed delayed or imperfect healing as reported by Ragan *et al.* (1950) following excess cortisone administration. These points must, however, be considered in the clinical application of cortisone to burned patients. It is probable that, clinically, the aim should be to restore the cortisone level to an amount adequate for the body to meet the emergency, thus supplementing the output from an exhausted adrenal gland, rather than to produce an excess of the hormone which in itself might have adverse effects.

It would at first glance seem to be contradictory to give a burned patient a substance which will produce many of the metabolic changes that a burned individual already shows. If, however, these findings are viewed from the standpoint that the changes result from the patient's own defence-response to the insult, which may be exhausted in the process, the therapy becomes logical. The administration of A.C.T.H., on the other hand, might not be expected to be useful if the adrenal gland is already exhausted.

Consideration might well be given to the possibility of the withdrawal effects, in view of the need for such surgical measures as skin-grafting within the week following treatment. If adrenal cortical activity is depressed after the administration of an excess of cortisone it might be undesirable to submit the patient to an operative stress while this state of affairs was present.

It is also apparent that, by carrying out the rather simple extractions of urine, as used in the methods for bio-assay of glycogenic corticosteroids, amounts of cortisone-active extract can be obtained sufficient for experimental work, which can be carried out with small animals.

Summary

Further evidence is presented that clinically there may be an adrenal exhaustion in severe burns.

Deaths from experimental thermal burns can be markedly reduced by treatment with a urinary extract containing cortisone-active material combined with intravenous shock therapy.

In carrying out this investigation, acknowledgment is made of the technical assistance of Flt. Sgt. L. C. Brock, L.A.C. C. B. O'Brien, L.A.C. F. E. Park, A.C.1 W. M. Barber, and A.C.1 R. D. Mayne, R.C.A.F.

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Meetings of the International Optical Commission were held in London at the Royal Society on July 17 and 18. The commission, which is part of the International Union of Pure and Applied Physics, was constituted at Delft in 1948 after a preparatory meeting in Prague in 1947; its purpose is to further international scientific relations in the field of optics. The London meeting is the first since the formation of the commission, and there were some 30 representatives from Great Britain, Belgium, Spain, the U.S.A., France, Italy, the Netherlands, Poland, Sweden, Switzerland, and Czechoslovakia. The president of the commission is Mr. T. Smith, F.R.S. (Great Britain), and the secretary Professor P. Fleury, of the Institut d'Optique, in Paris. The commission held joint meetings with the London Conference on Optical Instruments at the Imperial College of Science and Technology in South Kensington on July 19–26.

ANOMALOUS FINDINGS IN DIFFERENTIAL DIAGNOSIS OF JAUNDICE BY BIOCHEMICAL TESTS

BY

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In most cases of jaundice it is not possible to make a diagnosis by a single biochemical test, and it has sometimes been said that the so-called liver-function tests give little assistance in the diagnosis of that condition. Maclagan (1947) considered that in routine hospital work it was not practicable to carry out the full battery of tests recommended by some American authorities, and showed that by combining the estimation of serum alkaline phosphatase with his thymol turbidity test it was usually possible to make a diagnosis. Maclagan's scheme is particularly well adapted to the limited time and facilities available in a general clinical laboratory, and the present report illustrates its application in a series of cases of jaundice at Townleys Hospital, Bolton.

Although in a series of 200 cases Maclagan found no exception to the diagnostic criteria put forward, he gives a warning that occasional exceptions to them may be encountered. In the present series there are four cases in which the phosphatase and thymol turbidity findings are anomalous. These cases are given special consideration, because when using this scheme it is important that the possibility of an occasional misleading result should be fully appreciated. Reasons are given for thinking that exceptions are more likely to occur to the criteria for the diagnosis of obstructive jaundice than to those given for non-obstructive cases.

Without greatly adding to the work done it was found possible to include in the routine qualitative tests for urine urobilinogen and the estimation of serum albumin and globulin. The possibility that these further tests will sometimes provide the additional evidence required in difficult cases is discussed.

Methods Used

Colorimetric measurements were made on a Spekker absorptiometer.

Van den Bergh test: K. A. Evelyn and H. T. Malloy, *J. biol. Chem.*, 1937, **119**, 481.

Alkaline phosphatase: E. J. King, *Micro-analysis in Medical Biochemistry*, 1947, p. 56. Churchill, London.

Thymol turbidity: N. F. Maclagan, *Brit. J. exp. Path.*, 1944, **25**, 234.

Urobilinogen: Both Schlesinger's and Ehrlich's tests were used. G. A. Harrison, *Chemical Methods in Clinical Medicine*, 1947, p. 38. Churchill, London. *Recent Advances in Clinical Pathology*, edited by S. C. Dyke, 1947, p. 154. Churchill, London.

Serum protein (biuret method): G. A. Harrison, *Chemical Methods in Clinical Medicine*, 1947, p. 382. The method was modified by estimating the blue colour in the Spekker, using a curve drawn from a serum of known protein content estimated by the micro-Kjeldahl method.

The Present Series

Seventy consecutive cases of jaundice were investigated and tests were directed to establish a differential diagnosis between cases which were non-obstructive and those in which there was extrahepatic obstruction of the biliary tract. There were 46 cases of non-obstructive jaundice and 24 cases of obstructive jaundice (Table I). The ultimate diagnosis in each case was made on clinical grounds or on the findings at operation or necropsy. Most of the cases were seen at Townleys Hospital, Bolton, but a few were investigated at the Central Clinical Laboratory, Middlesbrough.

Meaning of the Table

The van den Bergh test was carried out to determine the degree of jaundice. It was not expected to assist in the differential diagnosis between obstructive and non-obstructive cases (Gray, 1947). The single case of haemolytic jaundice was, however, distinguished by being the only case in which the direct reaction was negative.

The results of the other tests are given in Table I, which shows only one set of tests for each case, though in a number of cases several sets were carried out. An exception, however, is made in a few cases in which a positive result was obtained to a particular test on one occasion and a negative result on another occasion. When this happened both results are tabulated.

Some explanation of the arrangement of the table is called for. The serum alkaline phosphatase values and the results of the thymol turbidity tests are tabulated according to the diagnostic criteria of Maclagan. According to these criteria a low alkaline phosphatase (less than 15 units) or a strongly positive thymol turbidity reaction (greater

TABLE I.—*Results of Tests*

	No. of Cases	Alkaline Phosphatase				Thymol Turbidity			Excess Urobilinogen		Derangement of Serum Protein	
		Low Units 5–14	Intermediate Units 15–20	Intermediate Units 21–35	High Units >35	Neg. Units 1–4	Weak Pos. Units 5–8	Strong Pos. Units >8	Neg.	Pos.	Neg.	Pos.
Obstructive jaundice:												
Carcinoma ..	18	Nil	1	2	15	18	Nil	Nil	12	Nil	7	Nil
Stone	6	Nil	Nil	3	3	6	Nil	Nil	6	Nil	3	Nil
Total ..	24	Nil	1	5	18	24	Nil	Nil	18	Nil	10	Nil
Non-obstructive cases:												
Acute hepatitis ..	32	11	7	8	3	14	5	14	15	15	19	6
Chronic hepatitis ..	5	1	1	Nil	3	Nil	1	4	Nil	5	Nil	5
Cirrhosis	6	1	Nil	3	1	2	Nil	4	1	5	3	2
Acute infection ..	2	2	Nil	Nil	Nil	1	1	Nil	1	1	2	Nil
Haemolytic ..	1	1	Nil	Nil	Nil	1	Nil	Nil	1	Nil	Nil	Nil
Total ..	46	16	8	11	7	18	7	22	18	26	24	13

Note.—Tests for derangement of serum protein and for urobilinogen were not carried out in the earlier cases of the series. In four cases the serum alkaline phosphatase was not estimated. One case had a negative thymol turbidity on one occasion and a strongly positive on another; both results are included. Similarly, in two cases urobilinogen was positive on one occasion and negative on another; both results are included.

than 8 units), or both, indicate that the jaundice is non-obstructive, whereas a high alkaline phosphatase (greater than 35 units) combined with a negative (1–4 units) or weakly positive (5–8 units) thymol turbidity indicates obstruction. Other combinations should be regarded as equivocal.

Tests for excess urobilinogen in the urine are recorded as positive or negative. For a positive result only Ehrlich's and Schlesinger's tests showing large amounts were accepted, small amounts being recorded as negative. The significance of excess urobilinogen is discussed by Pollak (1947). In the present series a strongly positive reaction in the absence of acute infection was considered to be evidence that jaundice was due to disease of the liver parenchyma and not to extrahepatic obstruction. Negative results were regarded as providing no evidence either way.

The type of change in the serum albumin and globulin found in some cases of hepatitis and cirrhosis is described by Higgins *et al.* (1944) and Sherlock (1946). In Table I a serum is described as showing derangement of the proteins if there is reversal of the albumin–globulin ratio with a globulin above 3.1 g.%, together with either an albumin below 3 g.% or a globulin above 3.5 g.%. Such a derangement was considered to be evidence of parenchymal liver disease. Again, negative findings were regarded as of no significance.

Analysis of the Results

It is not possible to show in the table how the results of the various tests combine in the individual case. Applying Maclagan's criteria to the phosphatase and thymol turbidity results, it was found that the correct diagnosis was made in 51 out of 70 cases (33 out of 46 non-obstructive cases and 18 out of 24 cases of obstruction). This compares with Maclagan's figure of 68% for a larger series. On the other hand, while 15 cases were classified as equivocal, three cases of hepatitis and one of cirrhosis were wrongly classified as obstructive jaundice by the occurrence of negative (three cases) or weakly positive (one case) thymol turbidity reactions combined with high alkaline phosphatase.

The number of cases of hepatitis or cirrhosis in which a diagnosis could be made by means of positive tests for urobilinogen or derangement of the serum protein can be seen in Table I. In no case did these tests lead to a misclassification. In many cases the urobilinogen and protein confirmed a diagnosis already made, but in others additional evidence was provided. The evidence of urobilinogen or protein enabled a firm diagnosis to be made in 3 of the 15 equivocal cases referred to above and also gave an indication of the correct diagnosis in the four cases wrongly classified.

Anomalous Thymol and Phosphatase Results

The four cases in which these findings were anomalous may be examined further. The biochemical results are set out in Table II. The clinical details were as follows.

Case 1: Subacute Hepatitis.—The onset of jaundice in a male diabetic aged 55 occurred three weeks before admission. On admission he was deeply jaundiced, wasted, and ill. The liver and spleen were enlarged. He developed ascites, which had to be tapped. After a long illness he made an apparently complete recovery. When seen 18 months later there were no signs or symptoms of liver disease.

Case 2: Subacute Hepatitis.—Four days before the birth of her first child a woman aged 28 was admitted to the maternity block with a history of mild jaundice and bile in the urine during the last few weeks of her pregnancy. When first seen 14 days after the birth of the child the jaundice was disappearing and the patient did not look ill, but the liver was enlarged to the umbilicus. At first she seemed to recover, but during the next 14 months she was never really well. There was developing mental slowness, with weakness and loss of weight. She suddenly became acutely ill and died in a few days. Necropsy revealed a terminal bronchopneumonia. The liver showed the picture of a healed hepatitis, with disorganization of the lobules by bands of fibrous tissue which contained islands of regenerated liver cells. There was also necrosis of the anterior lobe of the pituitary, which was thought to be the cause of death.

TABLE II.—*Biochemical Results in Four Cases with Anomalous Findings*

Case	Day of Disease	Serum Bilirubin mg./100 ml.	Alkaline Phosphatase Units	Thymol Turbidity Units	Excess of Urobilinogen	Serum Protein g. %		
						Total	Alb.	Glob.
1	21	23	25	2	Nil	6·0	2·7	3·3
	28	15	41	3	—	7·6	3·0	4·6
	53	12	55	2	+++	5·6	2·3	3·3
	18 mths.	<0·5	10	1		7·0	3·8	3·2
2	28	0·5	37	1	Trace	9·6	3·5	6·1
	35	<0·5	41	1	Nil	9·6	3·7	5·9
	42	<0·5	25	1	Nil	9·7	4·9	4·8
	11 mths.	<0·5	10	2		6·8	3·6	3·2
3	14	7·5	61	8		6·8	4·7	2·1
	28		67	6	++	6·8	3·8	3·0
4	35	5·0	72	7	++			
	2 mths.?	6·0	50	4	+++	7·1	4·7	2·4

Case 3: Acute Hepatitis.—This patient, a hemiplegic woman aged 50, was a clinically typical case of infective hepatitis. She recovered after two months, and never appeared very ill.

Case 4: Cirrhosis of the Liver.—A woman aged 50 was admitted with an enlarged liver and ascites. Necropsy revealed a multilobular cirrhosis of the liver.

Discussion

Consideration of Table I shows that in liver disease all four tests used can give results over a wide range. Gray (1949) describes the changes which occur in the various liver-function tests during the course of liver disease. He thinks that insufficient attention has been paid to the stage at which these tests have been carried out, and shows that different tests reveal maximum changes at different times during the course of the disease. A series of tests related to progress might have shown a more orderly pattern of result than is seen in Table I. Maclagan's scheme for the use of liver-function tests is directed to the single purpose of making a differential diagnosis. His series of cases, and the present smaller series, show that, in spite of wide variations in the results obtained, tests applied at an arbitrary time can give the correct diagnosis in most cases.

In 4 out of 70 cases in the present series Maclagan's diagnostic criteria gave misleading results, and in all four cases it was the criteria given for the diagnosis of obstruction which were at fault. A study of other papers suggests that the criteria for the diagnosis of obstruction might be found to be less reliable than those for the diagnosis of non-obstructive jaundice.

The results of large numbers of estimations of serum alkaline phosphatase and thymol turbidity tests are given in papers by Higgins *et al.* (1944), Maclagan (1944, 1947), Sherlock (1946), Maizels (1946), and Mawson (1948). While the papers do not describe the combined findings of high phosphatase and negative or weakly positive thymol turbidity, given as characteristic of obstructive jaundice, as occurring in cases of parenchymal liver disease, they contain a number of examples of both findings separately. Mawson describes a case of hepatitis in which the phosphatase was 33 units and the thymol turbidity 1 unit.

None of the results recorded in these papers would have led to a misclassification of obstructive jaundice as non-obstructive. Maclagan refers to the tendency towards positive flocculation reactions in cases of rheumatoid arthritis and heart failure even in the absence of jaundice, and states that the possibility that these diseases may be complications in cases of jaundice should be borne in mind. It would seem possible that an alkaline phosphatase of below 15 units might be found early in a case of minimal jaundice due to stone, but the chance of mistaking surgical obstruction for liver disease seems to be slight.

The present series is too small for any final conclusions to be drawn on whether the routine inclusion of tests for urobilinogen and derangement of the serum protein would make for a significant improvement in diagnostic precision. These tests pointed to the correct diagnosis in the four cases in which phosphatase and thymol findings were anomalous, but this might not occur again. No misleading results were obtained from these tests, but a larger series might not show the same freedom from fallacy. In the present series one case of carcinoma of the pancreas showed amounts of urobilinogen which, while not sufficient to be classified as strongly positive, caused serious consideration to be given to a diagnosis of chronic hepatitis in spite of a high phosphatase and negative thymol. Acute cholecystitis complicating obstruction due to stone could clearly give rise to large quantities of urobilinogen. A normal or slightly raised globulin with a low albumin can occur in cases of obstruction (Sherlock, 1946). These are changes in the same direction, but not to the same degree as the changes observed in hepatitis and cirrhosis.

Summary

The use of the diagnostic criteria of Maclagan is illustrated in a series of 70 cases of jaundice.

Four cases gave anomalous results, and these are discussed.

The use of routine tests for urobilinogen and for derangement of the serum proteins to give increased diagnostic precision is considered.

My thanks are due to Professor C. H. Gray for advice and criticism, to my colleagues at Townleys Hospital for access to their cases and advice, and to Mr. J. M. Ellice for carrying out many of the tests.

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The July number of *Marriage Guidance*, the monthly bulletin of the National Marriage Guidance Council, contains a brief report on the work done in 1949. For the first time all affiliated marriage-guidance councils were asked to submit returns of their year's work, and 67 replied. They showed a total of 6,540 married couples helped, and 1,076 engaged couples prepared for marriage. Forty-five of the councils attempted to classify their remedial work, and reported 1,096 successful cases, 679 unsuccessful, and 1,327 unknown, doubtful, or pending, though accurate classification is at present very difficult or impossible. There were 249 counsellors, 50 of whom have passed the national selection procedure and completed their training.

ACUTE IDIOPATHIC PORPHYRIA

REPORT OF TWO CASES

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Porphyria may occur as a congenital condition, with red urine, pink teeth, and hydroa aestivale, or as an acute disease, either idiopathic or toxic, or it may be produced by drugs such as sulphonal, methylsulphonal, and others. We are concerned here with the acute idiopathic variety. We have recently encountered three examples, and two of them are recorded. Had Case 1 been admitted during the later stages of her paralysis the diagnosis would probably not have been made, as the urine had then lost its colour. Case 2 came under her doctor's care for hallucinatory psychosis, porphyria being diagnosed only on her death-bed some weeks later, and in this patient previous bouts of "gastric ulcer" may well have been episodes of relapsing porphyria. The testing of urine for porphyrins with ultra-violet light is simple, and porphyria may explain puzzling cases of polyneuritis, Landry's ascending paralysis, psychosis, and acute abdominal pain.

Acute porphyria with nervous complications was first described by Ranking and Pardington (1890). Günther (1911) recorded 14 cases, and Waldenström (1937) 103 Swedish cases. The biochemistry has been defined by Fischer and Zerweck (1924), Rimington (1939), Dobriner and Rhoads (1940), Turner (1937), and others, and the pathology has been reviewed by Denny-Brown and Sciarra (1945).

Case 1

A woman aged 51 was seen in consultation with Dr. W. A. Whitehouse Parkes, of Sutton Coldfield, on April 7, 1948, and was at once admitted to hospital. For six weeks she had been complaining of sharp central abdominal pain, passing through to the back, associated with aching in her limbs, fatigue, and intractable insomnia. Three weeks before admission her urine had become dark red in colour and nephritis had been suspected; a week later she had a slight transient sore throat. There was no significant previous history, nor was there any exposure to lead, sulphonal, or antipyretics.

FIG. 1.—Case 1. Showing myasthenic appearance of the facies due to bilateral facial palsy. The patient was instructed to close her eyes. This appearance is also present during sleep.

On examination she was seen to be very ill, drowsy, disorientated, and confused, and had difficulty in answering questions. The skin had a brownish pigmentation and the conjunctivae were injected. The tongue was dry and coated. There was no tenderness in the abdomen,

rigidity, or undue distension. Examination of her central nervous system revealed no abnormality apart from her confused state. The urine was a dark burgundy colour and contained occasional casts; spectroscopic examination gave absorption bands for porphyrin, thus establishing the diagnosis of porphyria.

During the next 48 hours the drowsiness and confusion increased, and on April 9 she became irrational and endeavoured to climb out of bed. Twelve hours later her mental condition had improved, but she complained of some numbness below the waist. There was extensive weakness of lower motor neurone type involving all limbs and the trunk. The weakness affected the right side of the body more than the left, and the proximal limb segments more than the distal. Her biceps, triceps, and deltoids were particularly weak. Bilateral facial weakness of lower motor neurone type caused difficulty in closing the eyes, and gave her face a myasthenic appearance (Fig. 1). Ocular movements were normal; there was no difficulty in swallowing or in speech, and no palatal weakness. Screening of the chest showed diminished movement of the left cupola of the diaphragm. She was unable to raise her head and shoulders from the pillow or her legs from the bed. Despite the numbness of which she complained at the onset, all forms of sensation were unimpaired. For the next three days she had retention of urine. Her blood pressure was 150/100 mm. The electrocardiogram showed no abnormality.

Biochemical Findings.—Examination of the faeces on June 2 showed: coproporphyrin, 3.5 mg. in 24 hours; and protoporphyrin, 1.6 mg. On June 16 it showed: coproporphyrin, 2 mg.; protoporphyrin, 0.5 mg. Uroporphyrin was absent on both occasions. The urinary porphyrin content was estimated from April 14, 1948. The figures are shown in Fig. 2. The values given are those of total porphyrin, as efforts to obtain crystalline material were unsuccessful.

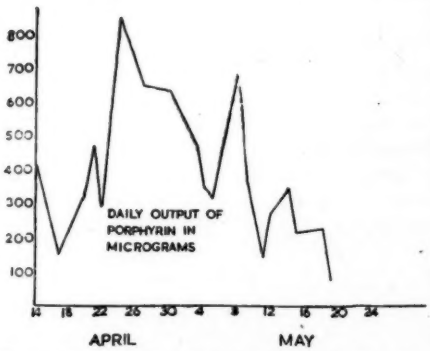

FIG. 2.—Case 1. Total daily output of porphyrin.

The estimations shown in Fig. 2 have been made by fluorometric comparison with a standard solution of porphyrin supplied by Professor C. Rimington. The values obtained by this method are considerably lower than those which might be expected when using the method of Sveinsson, Rimington, and Barnes (1949), but they are published because they give a comparative value of the daily excretion.

The wavelengths of the absorption bands are given in Table I. At all times there was a quantity of pigment which was not fluorescent, particularly when the urine was infected. This was later shown by Mr. Garfield Thomas to have the absorption bands of indolylacetic acid. Spectroscopic examination of the patient's serum showed no abnormal absorption bands.

TABLE I

	No. of Bands	Wavelength in Angstrom Units	Solvent	Dodds's Figures Compared	Solvent
Faecal protoporphyrin	2 (or 3)	5995 5535	5% HCl	6000 5540 (5740)	
Urinary coproporphyrin	3	5920 5710 5480	1% HCl	5920 5700 5480	20% HCl
Faecal coproporphyrin	3	5953 5705 5435		5920 5700 5480	
Urinary uroporphyrin	3	5959 5732 5520	5% HCl	5960 5770 5530	20% HCl

The urine contained granular casts. The cerebrospinal fluid had a high initial pressure of 280 mm., the cytology and protein content were normal, and no fluorescent substance could be demonstrated in it on examination by ultra-violet light.

Apart from the demonstration of these abnormal pigments in the urine and stool there was found to be a raised blood urea and a slightly raised serum total cholesterol. Serum potassium estimations were made, as it was felt that this predominantly motor weakness might be connected with a low value of serum potassium, but these were found to be consistently normal. The pathological and biochemical findings are summarized in Table II.

TABLE II

Date	White Cell Count	Blood Urea (mg./100 ml.)	Serum Total Cholesterol (mg./100 ml.)	Serum Potassium (mg./100 ml.)
8/4/48	5,600 (53% P., 42·7% L., 0·7% E., 0·3% B., 3% M.)	98	—	—
12/4/48	8,500	—	—	—
18/4/48	—	57	450	—
20/4/48	—	—	—	20
28/4/48	11,000	42	400	21
6/7/48	—	37	464	21·6

Serum albumin, 4 g./100 ml. Serum globulin, 2 g./100 ml.

Transillumination of the hands showed no loss of translucency of the metacarpal bones or phalanges when compared with those of a normal control. Exposure to an erythema dose of ultra-violet light disclosed no abnormal sensitivity.

Progress

Oral nicotinic acid and thiamin did not appear to influence the slow improvement; nor did neostigmine and quinine administered at different times produce any effect on the facial weakness. On April 29 there was a temporary return of bladder function, though on May 2 the patient was again unable to pass urine without the administration of carbachol. A *Bacterium coli* infection of the urine developed, and this was treated with sulphacetamide. The power of the grip had returned by May 4, the ability to close her eyes normally by May 10, and the power had begun to return in her biceps and triceps by May 11. On May 12 screening of the chest showed the diaphragm to be moving. By May 22 she had recovered enough power in the legs to walk a few steps with assistance, and was able to walk unaided by May 31.

One year later, on May 31, 1949, it was found that her urine had been free from discoloration and a specimen no longer fluoresced with ultra-violet light. There was still weakness of the extensor muscles of the legs, and a slight residual weakness of extension of the right wrist and fingers. Although there was no longer a demonstrable weakness of the muscles of her shoulder girdle or face, she complained of aching in these muscles after use. She was seen again on February 14, 1950, when there had been no further abdominal complaints, bladder disturbance, or weakness. The urine had been free from discoloration. There was some pain in the transverse arches of the feet which appeared to be due to pes planus, and occasional cramp-like pains in the muscles, chiefly in the thighs and upper arms. There was no demonstrable weakness of trunk, limbs, or face, her gait being normal. She could rise from the lying position without assistance and get up from a chair without difficulty.

Specimens of urine of the patient's three sisters and son (aged 19) had been found to be normal.

Case 2

A woman aged 74 was seen by us in her home in consultation with Dr. R. E. Wilkinson, of Bromsgrove, on December 12, 1949. Eight weeks previously she had begun to pass urine which was red in colour, and a week later her doctor had been called in because she had had visual hallucinations of objects flying around the room, or people coming and sitting on her bed and pinning her down. The only abnormal finding was a

blood pressure of 220/120, and on moving her to another bedroom the symptoms subsided. After five weeks she had an attack of bronchitis unaccompanied by pyrexia, and a week later she developed lower abdominal pain, associated with vomiting. For 10 days she had become increasingly weak, and during the previous 48 hours she had not made any movement of her arms or legs, her eyes had remained half-open when she slept, and there was dysphasia and complete retention of urine. She had had recurrent attacks of abdominal pain, attributed to a gastric ulcer, for many years.

On examination the patient was listless and apathetic, replying to questions in a low voice. Although comprehension was dull she was able to recognize people and respond to instructions. There was a bilateral facial weakness of lower motor neurone type causing difficult closure of the eyes. Beyond a feeble attempt to grip with both hands, the arms showed a complete flaccid paralysis. Her legs were also completely paralysed and no reflexes could be obtained. Her tongue was protruded a little to the right and there was difficulty in swallowing, but the palate moved normally. The bladder was painlessly distended almost to the umbilicus. There was no sensory loss.

The patient was catheterized and 640 ml. of burgundy-coloured urine withdrawn for examination. She was considered to be too ill to be transferred to the hospital. She died next day, and permission could not be obtained for a necropsy.

Biochemical Findings.—A portion of the urine specimen collected was forwarded to Professor C. Rimington, who reported as follows: "Coproporphyrin, 2.1 mg. per litre; uroporphyrin, 103.9 mg. per litre. Even allowing for the fact that the urine is a very concentrated specimen, these are enormous quantities even for acute porphyria. There seems to be little doubt about the nature of the condition from the chemical point of view."

Porphyrins were not found in the urine of the patient's grandchild.

Discussion

Aetiology.—Most authorities regard the condition as being not so much due to abnormality of the breakdown of blood pigments as to an anabolic abnormality of synthesis. This idea is supported by the occurrence of large amounts of porphyrin in foetal serum, bone marrow, and meconium. The only undisputed aetiological factors are familial incidence, which may persist through three generations, and the transmission of the disease as a Mendelian dominant.

Age and Sex Incidence.—Waldenström (1937) found that symptoms usually appeared between the ages of 21 and 25, and most deaths occurred between 26 and 30. Only one case over 61 was recorded, so that our second case, at the age of 74, must be one of the oldest patients on record. In Waldenström's (1937) series 65% were women.

Pathology.—The pathological changes described have been nerve-cell degeneration in the anterior horns of the spinal cord and, to a less extent, the posterior horns, associated with chromatolysis, eccentricity of the nucleus, lipoid pigment accumulation, and vacuolation (Bostroem, 1920; Courcoux *et al.*, 1929; Mason *et al.*, 1933). In cases in which paralysis has been brief there might be no demonstrable change in the nerves (Löffler, 1919; Rothman, 1926; Borst and Königdörffer, 1929), otherwise a patchy demyelination most marked in the nerves of the lower extremities was usual (Mason *et al.*, 1933). Demyelination in the spinal cord has been described by Courcoux only as a marginal demyelination of the antero-lateral tract of the lumbar cord. The cerebral glia may be laden with pigment (Grünewald, 1922), the oligodendroglia swollen, and the Purkinje cells of the cerebellum chromatolysed, or there may be a diffuse oedema of the brain (Eichler, 1932). Denny-Brown and Sciarra found gaps in the myelin in the nodes of Ranvier similar to nerve segments rendered ischaemic by pressure. Mason *et al.* (1933) and Palmer (1940) found scattered but constant lymphocytic infiltration. The pathogenesis of the disease is quite obscure.

Symptomatology and Signs.—The initial symptoms are severe cramp-like pains in the central abdomen accompanied by the passage of red-coloured urine. There ensues a widespread paralysis of the lower motor neurone type, often accompanied by a confusional state with delirium and hallucinations. Abdominal symptoms and porphyrin excretion may lessen before the neurological symptoms occur. In Case 1 the patient had lost her abdominal pain and became markedly disorientated before the onset of paralytic symptoms, which were heralded by a feeling of numbness below the waist. Paralysis may include bulbar muscles, intercostal muscles, diaphragm, or face. The distribution of the muscle weakness is that of a neuromyelitis rather than a peripheral neuritis, and proximal limb segments may be involved in excess of the distal. Both our cases showed bilateral facial palsy, which lent to the face a rather characteristic myasthenic appearance during sleep. Case 1 also showed a paresis of the right cupola of the diaphragm on screening. Oliguria is often observed, and when coupled with the findings of casts and red urine may lead to an erroneous diagnosis of acute nephritis. Death may take place from the results of bulbar or intercostal paralysis.

Differential Diagnosis.—Other conditions which cause extensive motor paralysis are acute ascending paralysis of Landry's type, diphtheria, poliomyelitis, acute infective polyneuritis, and botulism. It has been pointed out by Grünewald that many cases of ascending motor paralysis are really undiagnosed porphyrinuric neuromyelitis. Diphtheria produces a toxic polyneuritis which is very similar in type in that bulbar, facial, or diaphragmatic involvement may occur, and intercostal paralysis may cause death. It is interesting, when considering this, to note that *Corynebacterium diphtheriae* produces porphyrin in bouillon culture (Coulter and Stone, 1931). Lead poisoning is a condition which may be associated with a motor paralysis and porphyrinuria. Botulism is not often mentioned in the differential diagnosis, but is a condition in which bulbar paralysis may ensue after a gastro-intestinal upset. The symptomatic porphyria due to sulphonal or methylsulphonal—known as acute toxic porphyria—is very difficult to separate clinically from acute idiopathic porphyria.

Treatment.—There is no evidence that treatment has any effect on the disease.

Prognosis.—The mortality is given as being over 50% in the first attack (Mason *et al.*, 1933). Waldenström's mortality among the cases with the fully developed clinical picture was very much higher, for out of 46 cases 40 died and 1 committed suicide, and all 3 cases with nervous but no abdominal symptoms died. The lowest mortality was in the purely abdominal group: 4 out of 24 died; the others recovered (Waldenström, 1937).

Summary

Two cases of acute idiopathic porphyria with abdominal, mental, and polyneuritic symptoms are described. The polyneuritis was accompanied in both cases by a bilateral facial palsy and painless urinary retention, and in one case by a diaphragmatic weakness.

We should like to thank Mr. Garfield Thomas, of the Department of Biochemistry at the Queen Elizabeth Hospital, for his careful investigations of the pigments of the urine and stool, and Professor C. Rimington for his investigation of the urine of the second case, for a supply of porphyrin which was used as a standard for the estimations of Case 1, and for his kindly criticisms.

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POLIOMYELITIS AND IMMUNIZATION AGAINST WHOOPING-COUGH AND DIPHTHERIA

BY

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Public Health Laboratory Service

Following upon the reports of McCloskey (1950), Martin (1950), and Geffen (1950), we searched the records of our cases of poliomyelitis admitted to the Park Hospital during the years 1947–9 for evidence of any relationship between the onset of poliomyelitis and recent immunization. We found that two cases of paralysis of the arm occurring within three weeks of an immunizing injection in the same arm had been specially noted in the case records in 1947, but after that no further cases had been observed until July, 1949, when a more acute awareness of the problem began to develop in London. One of us (H. S. B.) reported five such cases in the annual report of the hospital for 1949. We were, however, somewhat surprised to discover no fewer than seven further cases by systematic search of the records and by following up clues with letters of inquiry to parents and public immunization clinics. This made a total of at least 14 (12.6%) such cases, all of them children under 5 years of age, among 111 paralytic poliomyelitis cases of all ages admitted during the period (Table I). Confirmation of the facts regarding date, site, and nature of the immunizing injection was obtained in practically all cases from the immunization clinics. No instance was observed of any relationship between immunization and non-paralytic poliomyelitis.

It is not our purpose to make any estimate of the statistical significance of our data. This has been done on a more adequate scale by Bradford Hill (1950). But, while we merely record the data observed in one hospital, it is pertinent to mention two facts. First, the incidence of poliomyelitis in England and Wales, including London, in 1947 and 1949 was the highest on record, but was much lower in 1948 (18 and 14 per 100,000 population in 1947 and 1949 and 4 per 100,000 in 1948). Secondly, the number of young children immunized against diphtheria and whooping-cough was at a high and increasing level during these three years. There can be little doubt that there would be frequent overlapping of these occurrences, and that many children would be likely to be immunized at a time when they were actually infected with the poliomyelitis virus, although showing no clinical signs of it.

TABLE I.—*Paralytic Poliomyelitis: Admissions and Deaths*

	1947	1948	1949	Total
Cases admitted ..	40	12	59	111
Deaths	2	0	6	8

Table II shows the preponderance of lower-limb paralysis in the group who were not immunized or who were immunized over six months prior to onset of poliomyelitis, and

TABLE II.—*Incidence of Paralysis in Upper (U) and Lower Limbs (L) in Relation to Immunization History*

	1947		1948		1949		Total	
	U	L	U	L	U	L	U	L
No immunization history ..	7	9	3	1	7	12	17	22
Not immunized or immunized over 6 months before ..	7	15	2	4	11	24	20	43
Immunized within 2 months:								
(*a*) Total	5	0	3	1	4	2	12	3
(*b*) Inoculated limb ..	5	0	3	1	4	1	12	2

the preponderance, on the contrary, of upper-limb paralysis in the group who were immunized within two months of onset of poliomyelitis. This latter group with one exception consisted of cases in which the same "double event" occurred; namely (1) inoculation for whooping-cough, diphtheria, or both combined; and (2) within two months of one of the injections in the course, the onset of poliomyelitis with paralysis *of a practically uniform pattern in the same limb*. In the upper limb it was the muscles of the shoulder-girdle (deltoid, spinati, and pectorals) and the biceps and triceps which were invariably the first to be paralysed, and were often the only muscles seriously paralysed, although weakness was not uncommon also in the neighbouring muscles of the trunk and forearm. Occasionally the other arm was also, but less extensively, affected, and in one case the paralysis starting in the inoculated arm rapidly became general and was fatal. In the lower limb the pattern was similar. The muscles of the inoculated buttock and thigh were the earliest and most seriously affected, the paralysis being restricted to the inoculated limb in nine cases, and spreading also to neighbouring muscles in five cases. Where neighbouring muscles were affected, in both upper and lower limbs, there was usually considerable return of function in them within three months, but not in the muscles first paralysed—namely, those of shoulder-girdle and upper arm, or buttock and thigh. There was no particular grouping of the cases in time or in place—for example, in association with any particular clinic, instruments, or batch of prophylactic.

The preponderance of upper-limb paralysis in those immunized within two months suggests the influence of the inoculation in determining the site of paralysis, since inoculations in London are much more frequently done in the arm than in the leg. The only exception in this group was a child of 10 months who, eleven days after a first injection of diphtheria alum-precipitated toxoid in

the left arm, developed poliomyelitis with paralysis of the left buttock and thigh. She has not been included among the 14 cases of "related" inoculation and paralysis. (Two further cases of interest in this connexion were a child of 6 years who developed paralysis of the right shoulder girdle and upper arm 15 days after tonsillectomy in May, 1947, and a child of 4 years who developed paralysis of the left shoulder-girdle and upper arm 15 days after tonsillectomy in October, 1949.) There was no reason to doubt the diagnosis of poliomyelitis in these cases, the stages of general symptoms, meningeal irritation, and paralysis, together with the spinal-fluid findings, all being characteristic.

In Tables III–VI are given data concerning the 14 cases (10 males and 4 females).

TABLE III.—*Cases of Paralysis in the Inoculated Limb in Relation to Prophylactic Used*

	1947	1948	1949	Total
Combined A.P.T. and pertussis	3	2	4	9
Pertussis	1	—	—	1
A.P.T.	1	2	1	4
Total ..	5	4	5	14

TABLE IV.—*Interval Between Inoculation and Paralysis*

Days After Last Inoculation	Cases
4	2
9–24	10
45	1
30–60*	1

* The exact date of onset of paralysis in this case was obscured by a severe intercurrent pneumonia.

TABLE V.—*Stage of Immunization and Paralysis*

Order of Last Inoculation	Cases
1st in course	5
2nd ,, ...	5
3rd ,, ...	3
4th ,, ...	1

TABLE VI.—*Age Incidence*

Age	Cases
Under 1 year	5
1–2 years	7
4–5 ,, ...	2

Summary and Conclusions

Inquiry into the cases of poliomyelitis admitted to one London hospital during the years 1947, 1948, and 1949 showed a total of 111 paralytic cases of all ages admitted during the period. Of these, 14, all under 5 years old, had a paralysis of the limb which had received one or more of a course of immunizing injections within the previous two months. The interval between the last injection and the onset of paralysis in the majority of the cases was between 9 and 14 days. The paralysis followed combined pertussis and diphtheria (A.P.T.) prophylactic in nine cases, pertussis vaccine alone in one case, and diphtheria prophylactic A.P.T. alone in four cases. The paralysis, whether of arm or leg, conformed in general to a uniform pattern. It was not associated in time or place with any particular clinic or technique. It is concluded that during periods of high or moderately high prevalence of poliomyelitis there is a definite but probably small risk that inoculation with the type of whooping-cough and diphtheria prophylactic usually employed in this country will be followed by serious flaccid paralysis of the inoculated limb in young children. The paralysis particularly affects the muscles adjoining the site of inoculation.

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Medical Memoranda

Simple Method of Treating Injuries of the Fingers

When a bone is fractured or a joint dislocated or sprained it is usually necessary to immobilize the affected part until the damaged tissues have had time to heal. Immobilization of the fingers is apt to result in stiffness of the joints, and if continued over a long period there may be some permanent limitation of movement. If, on the other hand, movements are begun early to prevent joint stiffness, there is often considerable discomfort and delayed healing of the torn joint capsule and collateral ligaments, with persistent painful swelling of the joint for several months.

On examination of a sprained finger-joint, either interphalangeal or metacarpo-phalangeal, the movements of flexion and extension are relatively painless, but attempted abduction and adduction movements, which stretch the damaged collateral ligament, produce pain. This is very severe in the interphalangeal joints, in which no side-to-side movement normally takes place, but is also found in the metacarpo-phalangeal joints, in which a considerable range of abduction and adduction is present in the extended position.

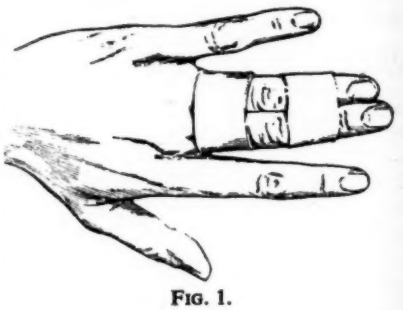

FIG. 1.

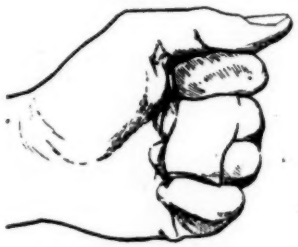

FIG. 2.

It is therefore desirable to prevent lateral movements of the sprained joint whilst encouraging active flexion and extension to prevent stiffness, and this can be achieved by the simple expedient of strapping the injured finger to an adjacent uninjured finger.

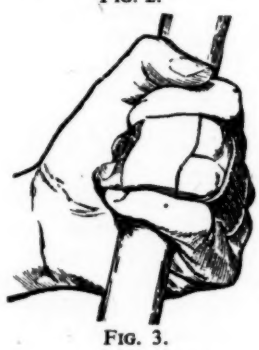

FIG. 3.

The index, middle, and ring fingers have their joints sufficiently near the same transverse axes for there to be no restriction of normal movement when they are strapped together, especially if an elastic adhesive strapping is used and applied with only slight tension. The fifth finger is shorter than the others, and when strapped to the ring-finger the normal movements are restricted, but there is still a sufficient range to prevent any permanent stiffness.

The illustrations show the method of application. Two strips of elastic adhesive strapping 1 in. (2.5 cm.) wide are applied transversely around the two fingers with the joints fully extended; the interphalangeal joints are left uncovered as much as possible. The elasticity of the

strapping allows the fingers to be fully flexed though the interphalangeal joints are not directly opposite each other.

This method has been extensively used for all types of sprains and reduced dislocations of the fingers, and has more recently been found equally effective in treating stable fractures of the phalanges and metacarpals. A chronic sprain with intractable pain can be manipulated after injecting the affected ligament with 1% procaine, and then splinted as for a recent sprain.

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Postgraduate Medical School of London.

Congenital Leukaemia

In view of the rarity of congenital leukaemia, the finding of leukaemic cells in the blood of an infant 1 month old is considered worthy of report.

CASE REPORT

A male child aged 1 month was sent to hospital because his mother was alarmed at the size of the child's abdomen. This enlargement had been noticed at birth, and in the succeeding month it had increased. At birth a few haemorrhages were noted on the skin of the abdominal wall and thighs, and he was given 10 mg. of vitamin K twice daily for three days. On direct questioning, the mother admitted that the child had been irritable for two weeks and had had a nasal discharge since birth. Jaundice of the sclerae had been noted on the day the child was brought to hospital.

The mother's pregnancy had been quite normal, and the child was delivered at term. The third stage of labour had been prolonged owing to a retained placenta, followed by a severe post-partum haemorrhage for which four pints (2.3 litres) of blood had been given. Unfortunately the placenta was not examined and there is no description of it at delivery.

The family history was essentially negative. No deaths from anaemia, leukaemia, or carcinoma could be traced. There was one sibling, aged 2, who was quite healthy, and a miscarriage at 5 months had occurred between the two live births. The patient had been breast-fed for two weeks and then put on a proprietary milk food, as the mother's milk failed.

On admission he weighed 9 lb. (4.1 kg.), his birth weight having been 7 lb. 7 oz. (3.4 kg.). He had a faint copper-coloured macular rash scattered sparsely over the trunk and neck, and more markedly on the thighs. There was no desquamation. The sclerae were icteric, but there was no jaundice of the skin or mucous membranes. The mouth contained numerous areas of shallow ulceration. The abdomen was greatly distended. The liver was palpable at the level of the iliac crest and was firm and smooth. The spleen was enlarged to three fingerbreadths below the costal margin and was very hard. The legs and back were oedematous. Generalized lymphadenopathy was present. A tentative diagnosis of congenital syphilis or leukaemia was made at this stage.

In the ensuing eight days the child became grossly oedematous. Bilateral papilloedema developed. Purpura appeared on the eighth day, a few hours before death. The rash was now thought to have been due to leukaemic infiltration.

Investigations.—On admission a blood count revealed: white cells, 1,600,000 per c.mm.; haemoglobin, 6.5 g.%; red cells, 2,000,000 per c.mm. Four days later the white cells totalled 1,400,000, the haemoglobin level had fallen to 3 g.% and the red cell count to 1,000,000. The peripheral blood picture was that of a "blast cell" leukaemia, almost certainly myeloblastic. There were also many pale staining cells of the reticulo-endothelial type. The packed cell volume was 50 ml. per 100 ml. of blood, that of the erythrocytes being 5 ml. and of the white cells 45 ml. The platelets were extremely scanty and it was not possible to count them. Marrow puncture from the crest of the left ileum revealed a picture similar to that of the blood. A few nucleated red cells were seen, and they totalled less than 1% of the marrow series. The serum alkaline phosphatase was 27 K.A. units, the direct van den Bergh test was positive, and the serum bilirubin was 6.4 mg. per 100 ml. A radiograph of the long bones revealed no abnormality.

The parent's and the child's Wassermann reaction and Kahn test were negative, and the mother's blood count was normal.

Necropsy Findings.—The main findings were a grossly enlarged liver (weight 250 g.) of greenish brown hue. The spleen was also considerably enlarged (weight 100 g.), of a deep maroon colour, and very hard in texture. The lymph nodes all showed enlargement and were of a deep red colour. The pancreas appeared to be replaced by a mass of tumour tissue. Numerous subserous petechiae were noted in the epicardium and in the gut. The kidneys were enlarged, pale, and yellowish in colour. In the brain there were large haemorrhagic areas, with necrosis in the right hemisphere, fourth ventricle, and posterior part of the third ventricle. These areas also appeared to be replaced by a mass of haemorrhagic tumour tissue. Two small areas of infiltration were seen on the left side of the vertebral bodies in the connective tissue at the rib origins. They did not appear to arise from bone. The bones were pale and normal in texture. Histological examination of all the organs mentioned revealed diffuse infiltration with leukaemic cells. In certain areas, such as the brain and connective tissue round the ribs, there were aggregations of these cells.

COMMENT

The definition of congenital leukaemia suggested by Kelsey and Anderson (1939) seems to be reasonable. They recommend that the term should be confined to those cases of leukaemia in which symptoms or signs are present at or within a few days of birth. Alternatively at necropsy there should be more infiltration than could reasonably have occurred had the process begun after birth.

The literature on congenital leukaemia has been reviewed elsewhere (Morrison *et al.*, 1939; Cross, 1944). Not all the cases described conform to the rigid criteria suggested by Kelsey and Anderson (1939), nor do some seem to have been differentiated from leukaemoid responses to infection in the neonatal period or from severe haemolytic disease of the newborn. It is interesting to note that none of the mothers of these cases were at the time of investigation suffering from leukaemia. Pregnancy in leukaemic women is extremely rare. Should it occur, the infants are apparently unaffected. Since Cross (1944) published 20 cases collected from the literature and described two new cases we have been able to find only one further report, adding three more (Housték and Brachfeldová, 1949). From these various observations it seems that congenital leukaemia is a definite clinical entity though excessively rare.

The case here reported is of interest because of the magnitude of the white count.

We wish to thank Professor R. S. Illingworth, under whose care the patient was admitted, for permission to publish and for his valuable criticism; and Dr. Emery for the pathological data.

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Morrison, M., Samwick, A. A., and Rubinstein, R. I. (1939). Ibid., **58**, 332.

The Group Offices of the Birkenhead Hospital Management Committee are now at St. James's Hospital, Tollemache Road, Birkenhead. The telephone number—Birkenhead 6336—is unchanged. The supplies department remains at the General Hospital, Birkenhead.

Reviews

OBSTETRICS AND GYNAECOLOGY

Combined Textbook of Obstetrics and Gynaecology. Edited by Dugald Baird, B.Sc., M.D., D.P.H., F.R.C.O.G. Fifth edition. (Pp. 1,411; 594 illustrations, 30 in colour. £3 10s., plus 1s. 3d. postage.) Edinburgh: E. and S. Livingstone. 1950.

The new edition of this excellent textbook is beautifully produced and will tempt many a student and many a practitioner. It is a clear and wise guide to obstetrics and gynaecology.

The editor, Professor Dugald Baird, is also a contributor. He has written new chapters on stillbirth and neonatal mortality, but has been incorrectly credited with those on diseases of the reproductive organs other than infections, which were written by Mr. Donald McIntyre, whose name was unfortunately omitted from the list of authors. Unless readers are to make invidious distinctions, the number of "eminent contributors" referred to on the cover should be increased from fourteen to sixteen. They have made a splendid team, and editorial skill has unified their contributions so that the book has few of the disadvantages often associated with a work by several authors.

The preface is perhaps a little complacent in asserting that "it is unlikely that many striking advances remain to be made in the surgical aspects of obstetrics and gynaecology"; "there is now little scope for improvement in maternal mortality"; and "the goal is no longer the prevention of death but the attainment of efficient physiological reproduction." An internationally eminent surgeon twenty years ago felt much the same of the future prospects of surgery, but since then some of the greatest technical advances of all time have been made. The heart, the lungs, and the brain, to mention but three new surgical fields, have been explored with brilliant successes. The results of treatment of carcinoma of the female reproductive tract leave much to be desired, and developments in this field alone in the next ten years may well give emphasis to the importance of improved techniques. Timely reference is made to the need for a preventive and physiological approach, and the introduction of a new chapter on the psychological aspects of obstetrics and gynaecology is a valuable addition to a well-balanced book.

The wisdom of having a section on gynaecological operations in a book for general practitioners and students is perhaps debatable, particularly in view of the inevitable and progressive decrease in general-practitioner surgeons under the National Health scheme. If it is considered advisable, the space allotted should permit of adequate reference to pre-operative and post-operative care. These subjects are of more importance to those for whom this book was written than is an abridged version of the technique of the Wertheim hysterectomy or the Millin sling operation.

Criticism can also be made of some of the illustrations, which, if adopted as guides by the relatively inexperienced, could well lead to disaster. Myomectomy through a posterior-wall incision and partial salpingectomy in the treatment of extrauterine gestation are two examples.

In view of the high standard maintained throughout the book these criticisms are of relatively minor importance. The editor and his team, as well as the publishers, are to be congratulated on the new edition.

JOHN STALLWORTHY.

HISTOPATHOLOGY OF THE EYE

Biomicroscopy of the Eye. Slit Lamp Microscopy of the Living Eye. By M. L. Berliner, M.D. Volume 2. (Pp. 785; 1,233 illustrations, including 503 in full colour. £12 12s.) London: Cassell and Company. 1950.

Histology and Histopathology of the Eye and its Adnexa. By I. G. Sommers, M.D. (Pp. 784; illustrated. £4 4s.) London: William Heinemann Medical Books. 1949.

The first volume of M. L. Berliner's work on biomicroscopy of the eye promised to be the definitive work on the subject in English. The appearance of the second volume after five years has made that promise a reality. In its wealth of illustrations and colour plates it almost rivals the monumental volumes by Vogt, but Berliner's work is more definitely a textbook than the monograph of personal observations recorded by Vogt. As such it is particularly welcome to the general reader. The writer reviews adequately and critically the extensive and scattered literature on the subject, but includes also a mass of original observations.

An adequate understanding of slit-lamp appearances requires a considerable knowledge of the minute anatomy of the eye and of its normal development. A sound appreciation of the congenital anomalies, the various pathological disturbances, and the genetic variations is equally necessary. Biomicroscopy is valuable because it has helped to fashion wider views of ocular pathology. The findings, so ably recorded and beautifully illustrated in this work, are set against the new background. It is to be hoped that in due course the author will bring out a further volume on the biomicroscopy of the fundus. The publishers have produced a book worthy of their author.

Sommers's book covers a wide field, and has some unusual features. It is essentially a class book, and the extensive bibliographies at the end of each chapter are preceded by brief notes on the more significant papers. These notes should be useful to the student as an introduction to the ferment of ideas and the conflict of findings that produce the apparently finite teaching in the text. The first hundred pages are on normal histology and the general principles of pathology. The histopathology of the eye is discussed on the usual anatomical lines. The author has succeeded in his self-imposed task of clarity in presentation, though this often leads to dogmatism—not always as acceptable to the advanced reader as to the student. The writer makes no claim to give an account of the pathology of the eye, but as an introduction to the histopathology the book is both competent and up to date.

ARNOLD SORSBY.

TEETH, MOUTH, AND JAWS

Klinik der Zahn-, Mund- und Kiefer-Krankheiten. By Professor Hermann Wolf. (Pp. 222; 165 figures. M.16.) Berlin and Munich: Urban and Schwarzenberg. 1950.

This book is very wide in its scope, although of only just over two hundred pages. The result is that the various sections are rather inadequately covered and the arrangement of the book appears muddled. A few pages on normal radiology of the jaws and teeth are followed by a further few pages on physiology. A section on diseases and clinical appearances, with a few notes on pathology, is followed by a section of about sixty pages on treatment.

This arrangement, where treatment is given in a separate section, is somewhat cumbersome, and as the notes on treatment are on the whole rather sketchy and inadequate the book cannot be recommended as a useful one for students or for doctors (for whom the book is also designed), at any rate in this country.

A. MACGREGOR.

GENIUS AND CRANK

Aus den Anfängen der Psychoanalyse. By Sigmund Freud. (Pp. 477. £1 10s.) London: Imago Publishing Co. 1950.

For any student of the vagaries of human thought this is a book of great historical interest. The letters that Freud wrote to a Berlin friend and colleague, Wilhelm Fliess, found their way during the National Socialist epoch in Germany into the hands of the book trade, and eventually came to the editors of this work, among whom is his daughter, Miss Anna Freud. The letters themselves—two-thirds of a total of over 280 are published here—date from the time when Freud was changing his interests from neurology to medical psychology. Freud confides to his friend his doubts and hesitations and his most original ideas as they spring fresh to his mind. One can read of the blind alleys which attracted him for a time, as well as of his first steps along those paths which led to the formulation of psycho-analytic doctrine as it still largely stands to-day.

Fliess himself remains a rather enigmatic figure. Apparently he was a throat-and-nose specialist who extended his interests more and more widely, first to the hypothetical relationship between the nose and the genital system, and later to a metaphysical biology. He must have been a crank of the first water. From such observations as that uterine haemorrhage at the time of the menses may be replaced by bleeding from the nose he goes on to assume a close connexion via the nervous system between the nose and the female genital apparatus, and from there to a bizarre hypothesis of two types of rhythm, the 28-day and the 23-day rhythm, to which both sexes and all ages are subject. The days of both birth and death are, he believed, determined by these rhythms, and the sex of the child is fixed by which of the two rhythms is passed on from the mother. There seems little doubt that Fliess exerted a considerable influence on Freud, who regarded him with the highest respect; and, though Fliess's more extreme ideas are hardly echoed in those of Freud, they share the strong emphasis on sexuality and the tendency to extend uncritical speculations over wider and wider fields. Freud's genius cannot be doubted; but one is tempted to wonder how much more scientifically satisfactory an edifice he might have erected if he had received discipline and encouragement from a less fanatical and more critical mentor.

ELIOT SLATER.

PRACTICAL PHARMACOLOGY

A Textbook of Pharmacology and Therapeutics. By Harold N. Wright, M.S., Ph.D., and Mildred Montag, R.N., M.A. Fourth edition. (Pp. 720; illustrated. £1.) Philadelphia and London: W. B. Saunders Company. 1948.

This book is intended for both doctors and nurses. It is well printed, and includes many diagrams, pictures, and photographs; these make it interesting and are useful in showing practical procedures, such as how to give an intravenous injection, or how to make up 500 ml. of 5% sodium bicarbonate solution.

By means of questions at the end of each section attention is concentrated on the points which should be remembered: "What is your attitude towards the alcoholic? Is he a moral degenerate? Would prohibition of the sale and use of alcohol solve the problem? What is the solution?" In addition to these there are lists of reference books and papers, so that special inquiries may be pursued further, though British readers will regret that all the references are American. There is no doubt that for nurses this is an excellent book.

J H. BURN.

BOOKS RECEIVED

Review is not precluded by notice here of books recently received

Foot Mechanics. By L. R. Smart, S.R.N., M.Ch.S. (Pp. 106. 6s.) London: Baillière, Tindall and Cox. 1950.

Chinese Eyesight and Spectacles. By O. D. Rasmussen. 4th revision. (Pp. 64. 4s. 6d.) Tonbridge: Tonbridge Free Press. 1950.

Practical Haematology. By J. V. Dacie, M.B., B.S., M.R.C.P. (Pp. 172. 10s. 6d.) London: Churchill. 1950.

Proceedings of the First Clinical ACTH Conference. Edited by J. R. Mote, M.D. (Pp. 607. 42s.) London: Churchill. 1950.

Proceedings of the British Academy, Vol. 31, 1945. (Pp. 424. 40s.) London: Geoffrey Cumberlege. 1950.

The Practice of Medicine. By J. C. Meakins, C.B.E., M.D., LL.D., D.Sc. 5th ed. (Pp. 1,558. 95s.) London: Henry Kimpton. 1950.

Textbook of Abnormal Psychology. By C. Landis and M. M. Bolles. Revised ed. (Pp. 634. 37s. 6d.) London: Macmillan. 1950.

Genes, Plants and People. By C. D. Darlington and K. Mather. (Pp. 187. 16s.) London: George Allen and Unwin. 1950.

A Text-Book of Neuro-Anatomy. By A. Kuntz, Ph.D., M.D. 5th ed. (Pp. 524. 61s. 6d.) London: Baillière, Tindall and Cox. 1950.

Textbook of the Principles and Practice of Medicine. By D. R. Dhar, M.B., D.T.M., M.R.C.P. (Pp. 750. 35s. 6d.) Calcutta: D.M. Library. 1950.

The Nursery School. By K. H. Read. (Pp. 264. 17s. 6d.) London and Philadelphia: W. B. Saunders. 1950.

A Year with Osler, 1896-1897. By J. H. Pratt. (Pp. 209. 32s.) Baltimore: Johns Hopkins Press. London: Geoffrey Cumberlege. 1949.

Nutrition in Ophthalmology. By J. J. Stern, M.D. (Pp. 137. $1.50.) New York: The National Vitamin Foundation, Inc. 1950.

Research in Medical Science. Edited by D. E. Green, Ph.D., and W. E. Knox, M.D. (Pp. 492. 48s.) New York: Macmillan. 1950.

Analytic Group Psychotherapy. By S. R. Slavson. (Pp 275. 22s. 6d.) New York: Columbia University Press. London: Geoffrey Cumberlege. 1950.

Tissue Culture Technique. By G. Cameron. 2nd ed. (Pp. 191. $4.20.) New York: Academic Press. 1950.

La Vie Sexuelle de la Femme. By A. Binet. 4th ed. (Pp. 404. No price.) Paris: L'Expansion Scientifique Française. 1950.

Asthma Bronchiale seu Nervosum: een Psychosomatische Studie. By J. Groen. (Pp. 208. No price.) Amsterdam: Scheltema and Holkema. 1950.

Allgemeine Konstitutionslehre. By K. Saller. (Pp. 210. M. 12.50.) Stuttgart: Marquardt. 1950.

Jugendpsychologie. By E. Stern. (Pp. 164. M. 9.50.) Stuttgart: Marquardt. 1950.

Le Cancer du Corps Utérin. Edited by P. Chalnet and others. (Pp. 247. No price.) Paris: L'Expansion Scientifique Française. 1950.

Der Gestaltkreis. By V. von Weizsäcker. 4th ed. (Pp. 203. M. 19.50. $4.65.) Stuttgart: Georg Thieme. 1950.

De l'Instinct à l'Esprit. By C. Baudouin. (Pp. 308. 85 Belgian francs.) Bruges: Desclée de Brouwer. 1950.

Markenagelung nach Küntscher. By C. Habler. (Pp. 302. M. 26.) Berlin: Urban and Schwarzenberg. 1950.

BRITISH MEDICAL JOURNAL
LONDON
SATURDAY JULY 29 1950

THE ANNUAL MEETING

In spite of the bad weather and of the fact that the Meeting was held in two adjacent towns, this year's Annual Meeting proved to be an enjoyable occasion which could well stand comparison with the recent meetings at Harrogate and Cambridge. Those responsible for the arrangements of the Meeting at Southport and Liverpool had done their work so efficiently that there seemed little or no break in the continuity of the Meeting when the scene was shifted from Southport to Liverpool on Monday, July 17. Dr. E. L. Roberts as Chairman of the Local Executive Committee for Southport, assisted by his Honorary Secretary, Dr. N. S. Walls, and their respective colleagues in Liverpool, Dr. C. O. Stallybrass and Dr. T. R. Roberton, earned the thanks of all those present for the unobtrusive but masterly way in which they kept the Meeting moving along its appointed course. As President-Elect and then as President Sir Henry Cohen was untiring in his efforts to make the Meeting a success. No matter what the occasion, small or great, he was there to welcome with courtesy and the apt word all who came. The brilliance of his Presidential Address was matched only by the friendliness with which he greeted his colleagues both in public and in private. The Civic Authorities at Southport and at Liverpool were unflagging in their efforts to make the visitor feel at home and find his way about with the minimum of inconvenience. Few who were there will forget the magnificence of the interior of Liverpool Town Hall. The Meeting, too, owed much to Liverpool University and its Vice-Chancellor, Dr. J. F. Mountford. The University buildings were admirably suited for the holding of the Scientific Sections. These were well attended, and, if one may judge from the space given to them in the national press, full of interest for the general public. The Proceedings of many of these Section Meetings are reported in this week's issue, and it is hoped to conclude the account of them next week. One of the most outstanding of the more scientific discussions was the symposium on the histology and physiology of the suprarenal cortex. There was a highly interesting and lively discussion on the antihistamine compounds, during which Professor J. H. Burn suggested that in the control of motion sickness a proper comparison had not yet been made between hyoscine and dramamine, the effects of which were so admirably described by Dr. Leslie Gay, of Baltimore. This year two new sections were established—one on geriatrics and the other on medical genetics, an indication no doubt of the growing awareness of the importance of these two subjects. The Honorary Local Science Secretary, Dr. A. MacDonald, and the Chairman of the Museum Committee, Professor S. H. Sheehan, should feel well content with the results of their labours.

In the intervals between discussion and debate members and their wives had every facility for seeing Liverpool, the great war-damaged port and one of the foremost of the provincial universities; they had the opportunity, too, to see the huge anglican cathedral which is slowly advancing towards completion, and to take part in the magnificent ceremonial of the religious service held, as tradition dictates, halfway through the Meeting. Among the many memories of a great occasion which a visiting member will take home with him not least will be that of the warmth and friendliness of the people of Lancashire.

ANNUAL REPRESENTATIVE MEETING

At last year's Annual Representative Meeting the Agenda was so full that many items of importance had on the last day to be dealt with at a pace which made it impossible to do full justice to them. This year an extra day was given to the A.R.M. as one way of avoiding a repetition of what took place last year. It is unfortunately not possible to say whether this extra day would have been sufficient to allow for full discussion of the large number of motions that have been left over for an adjourned A.R.M. to be held in the autumn. On Monday of last week much time was taken up by a discussion of two important matters, one of them unforeseen when the Agenda was drawn up. At the same time it is becoming clear that if the A.R.M. is to be conducted on past lines an extra day or even an extra two days is hardly likely to be enough. The A.R.M. has been aptly described as the doctors' parliament, and it is the function of the Representative Body to determine the policy of the B.M.A. This parliament meets but once a year. It would therefore seem that it is not the function of the R.B. to discuss matters in great detail, but the number of detailed amendments that came up before the Meeting at Southport seems to suggest that the opposite view is held. One great difficulty is that the A.R.M. provides the only occasion for each one of 400-odd representatives to say his piece and convince his constituents that he has taken an opportunity to

put forward their views. But if the A.R.M. is in future to get through its business in 3½ to 4 days then it may have to follow the example of the mother of parliaments and set aside prescribed time for set debates on the main issues that sort themselves out of the motions submitted by the Divisions. Some way out of the present situation must be found.

Anyone who thought that with the creation of new autonomous bodies the R.B. would become a rubber stamp must have been quickly disillusioned at Southport. Representatives debated a number of important questions in a responsible manner and did not easily accept the guidance of the platform. This was an encouraging sign for those who feared that the R.B. might become apathetic and acquiescent. For example, it insisted upon an annual review of the autonomous powers of the G.M.S. Committee and of the Central Consultants Committee, although it was advised it might be better to pass to the next business. In spite of the hint that the matter should be referred to Council, the A.R.M. passed the motion by the Harrow Division that the Amending Acts Committee should be reconstituted as a Standing Committee which should include among its members the chairmen of the R.B. and of the autonomous bodies, four members elected by the R.B., and four members elected by Council.

The Representative Body had previously shown its desire to be constructive in its approach to the problems of the National Health Service by passing without a dissentient vote the following motion put by the Winchester Division: "That this meeting considers the time long overdue when the Association should formulate a detailed programme of reforms the profession desires to be adopted in relation to the National Health Service and instructs the Council to draw up such a list forthwith for submission to and discussion by Branches and Divisions." During the past few years the Association has by force of circumstances often found itself on the defensive. Massive support given by the Meeting to the motions by Winchester and Harrow are significant because they show that the profession, having accepted the N.H.S. though aware of its many defects, is determined to press for reform along constructive lines. As subsequent debate showed, general practitioners are gravely disturbed by the lack of adequate diagnostic facilities, and motions demanding these were passed by the Meeting. Linked with this also was the desire of the Meeting to see that the practitioner should have proper access to hospitals and hospital work. Throughout the A.R.M. there was this repeated emphasis on conditions of work and on the desire of general practitioners to have all those facilities which would make it possible for them to bring the resources of modern medicine to the bedside of their patients. That general practitioners are still resentful of the treatment they have received at the hands of the Minister of Health was shown by the enthusiasm with which they endorsed resolutions on remuneration and on the status of the general practitioner which were passed by the Special Conference of Local Medical Committees held on June 29 of this year. Once more the question of arbitration arose, and the Meeting turned down a motion which called for the setting up of an independent court of arbitration.

These are but some of the many matters discussed at the A.R.M. and reported fully in the *Supplement* to last week's *Journal*. The two matters which engrossed the attention of the R.B. on the last morning of its debates were the combined Meeting of the B.M.A. and the South African Medical Association next year, and two motions relating to B.M.A. officials and parliamentary candidature. The Council had already discussed at great length the possibility that non-European members of the B.M.A. might, because of what is widely known as the colour bar, suffer embarrassment if they attended the Meeting in South Africa next year. In putting forward the recommendation to the A.R.M. which was published in the *Supplement* last week the Council expressed its desire to hold a joint meeting with the South African Medical Association and emphasized that it in no way wished to interfere with the internal affairs of South Africa. It was concerned solely with what it believed to be the interests of the members of the B.M.A. The Representative Body treated the matter with the greatest seriousness, and after a debate, the tone of which was sustained at a high level, turned down the Council's recommendation. There can be no doubt that our South African medical colleagues will do their best to welcome any member of the British Medical Association who finds it possible to attend the meeting in Johannesburg next year. The second matter arose out of the two motions by the Divisions of Bromley and of Oxford. Dr. Charles Hill explained that his parliamentary work made it difficult for him to continue in the post of Secretary, and he had therefore asked the Chairman of Council that he should be released from his duties as Secretary at the earliest convenient moment. Dr. Hill joined the official staff as an Assistant Medical Secretary in 1932, was appointed Deputy Medical Secretary in 1935, and succeeded the late Dr. G. C. Anderson as Secretary in 1944. During the past 18 years he has put his great energy and ability at the disposal of the British Medical Association, and those who know what this has meant for the Association will regret his departure and wish him success in his new career in Parliament.

STRUCTURE OF THE LIVING ORGANISM

After an interval of 14 years the fifth International Anatomical Congress has this week succeeded the fourth, and elsewhere in this issue we publish an absorbing review of progress and trends in the science of anatomy which the president, Professor W. E. Le Gros Clark, gave on July 25 in the Sheldonian Theatre at Oxford.

It is important that medical men and women should appreciate the exciting developments that have been taking place in one of the two "institutes of medicine," as anatomy and physiology used so rightly to be called. In the past the growth of the study of structure has several times surprised those who thought that it was not a very progressive subject, and just over two centuries ago Haller noted that it had advanced so far in a short time as to have become almost a new science. The statement is even more applicable to the great progress made during the last three decades of the present century. As those who were then students can remember, its scope in 1920 did not extend much beyond the bones, joined together in orderly fashion, with the sinews and flesh upon them, and the whole covered with skin—in fact, with stage one of the vision described in *Ezekiel* xxxvii, or what we should call topographical anatomy. Since then breath has entered into that ordered congeries of structural components, as in Ezekiel's stage two, and they have become a living body; or, as Professor Le Gros Clark puts it, "Anatomy . . . has (now) as its ultimate aim the study of the form and structure of the living organism." In that sentence he states concisely not only the new outlook in his own subject but also the dividing line which still separates it from physiology. With both disciplines mainly concerned with the living organism and its constituent parts, and therefore having so much in common on the technical side, it is important to be clear where anatomy ends and physiology begins. Even so the ever-increasing incursions of the anatomist into physiology and of the physiologist into anatomy are welcome.

This disappearance of an earlier artificial separation of the two subjects is part and parcel of a wider change which has become evident in recent years, and medicine is profiting by the greater integration of its preclinical sciences both with each other and also with clinical studies and practice. This development has been of particular interest in the history of anatomy and physiology. For the latter, in its earlier stages, was largely a series of functional hypotheses based upon considerations of structure, and it was only as experimental methods began to be used in physiology that the combined chairs of the two subjects became subdivided. Johannes Müller, who held such a combined post in Berlin, taught anatomy in winter and physiology in summer. If he were asked a physiology question in winter, he would reply, "Das weiss ich nur im Sommer," and vice versa.

After the establishment of independent disciplines, which occurred in most medical centres during the nineteenth century, physiology went ahead with such increasing momentum that biochemistry finally separated off in most places as an independent science, and there are even now signs that biophysics may follow suit.

Anatomy, meanwhile, for a long time did not advance so spectacularly, though it would be wrong to say that it remained stationary—a careful reader, for instance, of the earlier volumes of the *Journal of Anatomy* can find therein many foreshadowings of present-day researches. Anatomists, of course, were less numerous in those days, and they had few of the resources now available for research or of the techniques, largely derived from advances in the physical sciences, which can now be employed. Nevertheless it is just to acknowledge that the new anatomists have made full use of their greater numbers and richer opportunities, and have thereby given the present-day science of form and structure a living and exciting character that it could not previously claim. With this metamorphosis of the science, particularly in Britain, Professor Le Gros Clark has been very closely associated, so it was specially fitting that he should preside over the fifth Congress. When Lavater saw a portrait of John Hunter, his immediate remark was, "This man thought for himself." Anatomists to-day are carrying on in Hunterian fashion, even if few of them can aspire to his heights, and all who were present at the Oxford meeting were deeply impressed with the evidence there presented that something in the way of a heroic age of the science is in being.

Professor Le Gros Clark admittedly did not cover all aspects of the subject, and one that he did not mention, though it would have appealed particularly to his predecessor in the Oxford chair, Professor Arthur Thomson, was the relation of anatomy to art. In this respect anatomy has probably remained more or less where it was, but on the other hand recent technical advances have revealed more clearly than ever before the beauties of bodily structure, and particularly of functioning structure. The glory of the scientist, like that of the warrior, orator, or singer, is often "paid with a voice flying by to be lost on an endless sea," but the anatomist has his compensations for the transience of fame if in the course of his work he can so often be rewarded by new views of the beauty which is inherent in the form and structure of the body.

PORPHYRIA

Within the last two or three years a number of cases of acute porphyria have been reported in the medical journals of this country, the latest contribution being that by Drs. D. W. Ashby and E. Bulmer elsewhere in this issue. Discombe[1] pointed out in 1948 the difficulties of accurate diagnosis, and expressed surprise at the fact that only one case of porphyria had been encountered between 1942 and 1947 in the group of hospitals served by his laboratory. Waldenström[2] in a study of the world distribution of acute porphyria found the following cases reported up to 1937: Sweden (including his own cases) 103, Germany 23, England 13, Switzerland 10, Holland 9, Norway 7, Finland 7, Italy 6, U.S.A. 5, Denmark 4, France 2 or 3, Austria 2. There is an undoubted correspondence between these numbers and the amount of interest in porphyrins in the countries concerned. Thus in Germany several workers, including Günther, Fischer, and Schumm, had for long enriched medical literature with work on the porphyrins, and in this country such pioneers as Garrod had performed a similar service. The high incidence in Sweden may be related to the comparatively static nature of the rural populations and the corresponding degree of intermarriage, as well as to Waldenström's very thorough survey of hospital records and of the population as a whole. It may be, then, that the increasing number of cases recorded in Britain does not reflect a true increase in the disease, but rather a growing familiarity with diseases of pigment metabolism on the part of surgeons, physicians, and pathologists, and hence more frequent diagnostic recognition.

Porphyrins occur in the urine as the result either of poisoning or of an inheritable metabolic error, most probably in the production of the haem pigments. Waldenström distinguished three main types of the latter true porphyrias.

The first is congenital porphyria, present at birth. The signs are photosensitivity, pigmentation of the bones and teeth by porphyrin, and massive excretion of uroporphyrin (mainly series I) and coproporphyrin in the urine. It is inherited as a recessive. The second is acute porphyria, which generally becomes manifest only about the second decade of life, without photosensitivity or bone pigmentation. It is characterized by intermittent attacks of acute abdominal colic accompanied by constipation and vomiting, by porphobilinogen and uroporphyrin in the urine, and often by involvement of the nervous system. It is inherited as a dominant. The third type is porphyria cutanea tarda, in which photosensitivity accompanies intermittent attacks resembling those of acute porphyria. There is no evidence on the inheritance of this condition. Congenital porphyria is undoubtedly much rarer than acute porphyria. Waldenström noted that not a single case of congenital porphyria has been recorded with certainty in Sweden, though 103 cases of acute porphyria had been described.

The origin of the uroporphyrin which is eliminated in both these diseases is obscure. Though it is natural to suspect that the haematopoietic system is at fault in each, anaemia, if present, is never of great severity. Recent work on the biogenesis of the porphyrins and haem, in which compounds labelled with isotopes have been used, has helped to explain this. Shemin and Rittenberg[3] have shown that the building stones for the porphyrin ring are such simple and abundant materials as glycine and acetic acid, and anaemia due to lack of these precursors of haemoglobin is hardly to be expected. Furthermore, support has been found for the hypothesis, already formulated by Turner,[4] Lemberg and Legge,[5] and more recently by Neuberger, Muir, and Gray,[6] that the first porphyrin to be formed is highly carboxylated—probably a uroporphyrin—and that this is transformed into protohaem by progressive decarboxylation, desaturation, and other processes. If this picture of porphyrinogenesis is accepted the errors in acute and congenital porphyrias may be the result of absence or decrease of specific enzymes, such as those undoubtedly concerned in the decarboxylation of a type III uroporphyrin to coproporphyrin III, or in the elaboration of pyrrol precursor units into the uroporphyrin III configuration. Indeed a generalized hypothesis of this kind was put forward by Rimington[7] in 1938.

Much has been written on whether the porphyrins themselves cause the symptoms of acute porphyria. Discombe[1] emphasized the close similarity between acute porphyria and lead poisoning in which extensive coproporphyrinuria occurs. It is difficult to understand, however, why the abdominal colic, constipation, and nervous symptoms do not occur also in congenital porphyria, in which porphyrin is present in the circulation and tissues. The explanation is possibly that it is not the porphyrins themselves but pyrrolic precursors, such as porphobilinogen, which are responsible for the symptoms; congenital porphyria is chemically different from acute porphyria. There is at present no satisfactory treatment for acute porphyria. Injections of calcium salts or of B vitamins have been tried, but with dubious success. It seems clear that a rational therapy must wait upon a clearer understanding of the chemical pathology of the disease.

1 *British Medical Journal*, 1948, **2**, 659.
2 *Acta med. scand., Suppl.* 82, *Studien über Porphyrie*, 1937.
3 *J. biol. Chem.*, 1946, **166**, 627.
4 *J. Lab. clin. Med.*, 1940, **26**, 323.
5 *Haematin Compounds and Bile Pigments*, 1949, London.
6 *Nature, Lond.*, 1950, **165**, 948.
7 *C.R. Trav. Lab. Carlsberg* (*Ser. chim.*), 1938, **22**, 454.

AMOEBIASIS IN BRITAIN

Autochthonous cases of frank amoebic dysentery in this country are rare, despite an appreciable incidence of the causative organisms. The return of a great many persons infected overseas during two great wars has not demonstrably increased the number of such cases. Elsewhere in this issue Dr. C. A. Hoare, a medical protozoologist, considers the significance of infection of persons in this country with *Entamoeba histolytica*, and restates the different theories that have been advanced to explain why infection with this parasite in some persons or in certain areas causes disease, while in others no symptoms attributable to its presence are evident.

The view that *E. histolytica* can flourish either as a purely commensal parasite or as a pathogen is apparently regarded by Dr. Hoare as proved. The course of the ordinary case of amoebic dysentery is one of relapse and remission. In most cases the relapses are mild and of short duration; the symptomless intermissions may extend over months or years. Thus the asymptomatic carrier of *E. histolytica* is not clinically distinguishable

from the mild case of amoebic dysentery except during the exacerbations of the disease. Carrier cases and also cases of relapsing dysentery during intermissions pass cysts in formed stools and amoebae in loose stools; the amoebae from either type of case will be found to contain bacteria, which may have been ingested by the parasite or may have invaded it—a point by no means clearly established. From neither will haematophagous amoebae be recovered; indeed, even during severe attacks the number of amoebae which contain engorged red cells is an extremely small proportion of the total found in the stools, and these parasites contain bacteria in addition. The sole differentiation, therefore, between the carrier and the sufferer from mild amoebic dysentery lies in the fact that the latter has a history of attacks of dysentery while the former has not. Logically, therefore, if the hypothesis of alternative pathogenicity or commensalism is accepted it is to be inferred that *E. histolytica* in cases of symptomatic infection alternates between pathogenicity and commensalism. The absence from a case of amoebic dysentery during the intermissions of lesions visible on sigmoidoscopy could be adduced to support this view; in fact in only a small proportion of cases of chronic relapsing amoebic dysentery are lesions seen in the rectum during the attack, and so this means little.

There remains much to learn about this infection. Until a clearer picture of the mechanism of *E. histolytica* infection can be drawn it will remain advisable in practice to regard all such infections, possibly with the exception of those due to small cyst-forming strains, as potentially inimical to the host, and therefore requiring suitable treatment.

RESEARCH IN RADIOTHERAPY

Cancer research is one of the branches of medical activity which engages the time and interest of many workers. The success of the profession in reducing the likelihood of death from other causes and the increasing probability that people will die of cancer are ample justification for the resources employed in the solution of the cancer problem. Most research is done on the causes of cancer in the laboratory. Only when the true cause of the disease is discovered will it be possible to adopt a rational system of treatment; meanwhile, some patients may be cured or their lot ameliorated by methods which are of general application. To compare these methods would seem at first sight to be relatively easy, not only in connexion with cancer but in many other branches of medicine, but when it comes to analysing published results the fact often emerges that definite conclusions cannot justifiably be drawn. The report[1] by Wood and Boas of the work of the Medical Research Council's Radiotherapeutic Research Unit is therefore welcome (its publication incidentally coinciding with the opening of the International Congress of Radiology in London), for it might be taken as a model of what can be achieved by using two statistically comparable series of patients in a clinical experiment. The object of the experiment was to compare the effects of *x* rays with those of radium in the treatment of patients with cancer of the mouth, larynx, and pharynx. The physical conditions of dose distribution and the timing of the treatments were the same in both series. It was found that radium caused less reaction for the same dose in these standard conditions, but there was no significant difference in the effects on the tumours. Statistical analysis of the results showed that there was no reason to expect a difference in the nature of response of glands and primary tumours. Further useful information might be obtained by trying to correlate growth rate with response to gamma rays and to *x* rays: the figures suggest that gamma rays might be more effective than *x* rays with the slowly growing tumours—for instance, tumours of the larynx. In addition histological changes might be studied in relation to the type of radiation used.

The value of this report, apart from its clear account of a well-conceived and well-executed experiment, lies in its emphasis on the necessity for the planning of experiments and for team-work in radiotherapeutic research, in the account of statistical methods applicable to clinical material—the results have been presented very clearly—and in the discussion of the techniques to be used in radiotherapy in the future. There is a short account of the merits of supervoltage therapy, with a suggestion that 2–4 million volts gives better results than 20 million volts, and that such therapy is likely to be no less—or more—efficient than electron or neutron therapy. Neutron therapy might, however, have been given more consideration.

[1] *Researches on the Radiotherapy of Oral Cancer*, Spec. Rep. Ser. med. Res. Coun., Lond. No. 272. 1950. H.M.S.O.

SIR HERBERT BARKER

The death of Sir Herbert Barker at the age of 81 recalls for medical men the action of the General Medical Council when in 1911 it struck off the *Medical Register* Dr. F. W. Axham, who had qualified in 1861. The complainants were the Medical Defence Union. The charge read as follows: "That you have knowingly and wilfully on various occasions assisted one Herbert Atkinson Barker, an unregistered person practising in a department of surgery, in carrying on such practice by administering anaesthetics on his behalf to persons coming to him for treatment. And that in relation thereto you have been guilty of infamous conduct in a professional aspect." Dr. Axham said he had resigned both his practice and his connexion with Mr. Barker, but could not undertake that he would not administer anaesthetics for Mr. Barker in future. His name was struck off the *Medical Register*. In 1926 the Royal College of Physicians of Edinburgh restored to Dr. Axham the rights and privileges of a Licentiate—"on proof submitted that [he] has abstained for the last five years from the practices which led to his suspension and will not resume them." A week before this the Royal College of Surgeons of England had refused to restore Dr. Axham to Membership of the College. Dr. Axham died in April, 1926, at the age of 86. His vindication came when Sir Herbert Barker was invited by the British Orthopaedic Association to demonstrate his methods at St. Thomas's Hospital in July, 1936, when "the warm thanks of the meeting for a most interesting demonstration were conveyed by Mr. T. P. McMurray."[1] A year later Mr. W. Rowley Bristow, describing Sir Herbert Barker's methods, wrote as follows: "It is due to Barker to say

[1] *British Medical Journal*, 1936, **2**, 255.
[2] *Lancet*, 1937, **1**, 546.

that but for his pioneer work the manipulative field of orthopaedic surgery would not occupy the position it does to-day, and that had his offer to demonstrate his technique been accepted 25 years ago the general utilization of this branch of therapeutics would not have been so long delayed."[2]

Herbert Barker had been taught bone-setting by his cousin John Atkinson, who had learnt it from Robert Hutton, one of a family who had practised this technique for 200 years. He was always at pains to point out that he was not an osteopath. By his skill and personality he compelled the medical profession to relearn a lesson they had forgotten. In the seventeenth century, for example, St. Bartholomew's Hospital had on its staff a surgeon bone-setter and an assistant bone-setter—posts which were allowed to lapse. James Paget in 1867 published in this *Journal* an article in which he warned readers that if the bone-setter "can cure a case which you have failed to cure, his fortune may be made and yours marred." The history of bone-setting seems to have been ignored by the General Medical Council when it struck Dr. Axham off the *Register* in 1911.

BLOOD SUPPLY OF PERIPHERAL NERVES

Ischaemia can cause loss of function of peripheral nerves and is thought to be of particular importance in the temporary disturbances which commonly result from pressure on the nerve. Less attention has been given to the effects of obliterative arterial disease affecting the vasa nervorum. Roberts[1] has published some experimental observations on dogs which bear on this problem. He demonstrated the arteries supplying the sciatic nerves by injecting dye into the aorta and then dissecting the stained arteries. Nutrient arteries were found to enter the sciatic nerve at intervals of 1 to 3 in. (2.5–7.5 cm.) and to supply a plexus of longitudinal vessels running in the epineurium : these vessels supplied a finely meshed plexus of arterioles, capillaries, and venules which were distributed longitudinally within the central part of the nerve. Various methods of obstructing the blood supply of the nerves were tested, and the effects were judged in some animals by dye injection and dissection and in others by observing disturbances of function. Ligation of a segmental nutrient artery caused no disturbance, but when all the nutrient arteries to the sciatic nerve between the hip and knee were ligated there was weakness of the hamstrings and of the extensor muscles of the foot. Histological examination showed that ligation of a single artery did not greatly impair the blood supply to the nerve because of the vascular plexus. Stripping the perineurium caused definite ischaemia, and if it was stripped for a distance weakness and sensory changes occurred in the leg and foot. Stretching of the nerve and its compression by ligatures also caused ischaemia of the affected part of the nerve. Embolism of the nutrient arteries was observed after the injection of lycopodium spores ; the small blood vessels in the centre of the nerve were blocked as well as the epineural vessels, and dye injected into the aorta did not enter these arteries. In the dogs which were kept alive after the injections neural function was impaired.

[1] *Amer. Heart J.*, 1948, **35**, 369.
[2] *Proc. Mayo Clin.*, 1949, **24**, 48.

The relationship of vascular disease in man to peripheral nerve function has not received much attention, but in one disease—periarteritis nodosa—recent pathological studies have clearly demonstrated the cause of peripheral nerve dysfunction. It is usual in this disease for nerves to be affected individually, either at the same time or at varying intervals—a type of disturbance which has been called mononeuritis multiplex—though rather less commonly a symmetrical peripheral neuritis may occur. Lovshin and Kernohan[2] studied the peripheral nerves in 29 fatal cases of the disease and found abnormalities in 15 of them. In these cases lesions of the nutrient arteries to the nerves were similar to those in the visceral arteries, with sharply localized infarcts in the nerves coinciding with the level of greatest vascular damage.

OPTICS AND MEDICINE

The importance to medical science of a resourceful development of applied optics is self-evident but seldom acknowledged. Apart from microscopy, in which there have been a number of fundamental innovations in recent years, ultra-violet and infra-red spectroscopy have been of increasing usefulness in research, and in conjunction with the reflecting microscope they offer the means for advances in the correlation of cell structure and biochemistry which can hardly yet be assessed. As a result of wartime requirements there was an expansion in the size and output of the British optical industry which has been estimated at two and a half fold, but for the retention of even Britain's pre-war position it is necessary that there should be supporting research in applied optics, and also that there should be a steady flow into industry of men possessed of practical training and of scientific knowledge and background.

Other countries, notably France, have founded "optical institutes." In Great Britain, specialization has been postponed until after the completion of university training in physics up to degree standard ; only at London University, at the Imperial College of Science and Technology, is there a section of technical optics in which practical training as well as research is undertaken. The instruction given covers the whole ground from workshop practice and the measurement of lens characteristics to advanced theoretical optics and the properties of the eye in relation to instrument performance. Research in progress includes work on the resolving power of lenses and on the extent to which involuntary eye movements interfere with ideal fixation on a localized object. There are indications that the equipment developed for this latter purpose may also prove of value in the study of nystagmus. Under Professor L. C. Martin the technical optics section at the Imperial College has exercised an influence on both research and training which has been out of all proportion to its physical size. Extra accommodation and equipment have lately been provided with help from the University Grants Committee, and it is hoped in future to cater for a yearly intake of ten new students. Past students have come mainly from the physics course at the Imperial College, but with the expansion which has become possible it is desirable that the facilities offered by the section should be more widely known.

REFRESHER COURSE FOR GENERAL PRACTITIONERS

CARCINOMA OF THE STOMACH

BY

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Carcinoma of the stomach is one of the commonest of neoplasms, and one of the most malignant. It arises insidiously and in its early stages gives rise to no striking or characteristic symptoms; it spreads rapidly and soon extends beyond the limits of operative extirpation. Often the disease is already far advanced by the time the patient consults his doctor, and in some cases, though operation is performed without delay, the prospect of a permanent cure is small.

Gloomy though the picture appears, it is not without relieving features. In recent years advances in medical care and in surgical technique have enlarged the scope of operation and at the same time reduced its dangers. Improvements in pre-operative preparation, particularly the more ready recourse to intravenous administration of fluids, protein, and blood, now enable all but the most feeble patients to be brought into a condition suitable for operation, while technical advances, particularly the extended use of the thoracic approach, have made it possible to remove growths which formerly were regarded as inoperable. It is now practicable to remove growths originating in any part of the stomach, including the fundus and cardia, while the operation of total gastrectomy has lost much of its former danger.

As in all other forms of malignant disease early diagnosis is all-important, and it is with this aspect of the problem that this paper is mainly concerned.

Predisposing Factors

In those forms of malignant disease which develop on the basis of recognized predisposing factors the most promising line of attack is in the precancerous stage. It has long been recognized that chronic gastric ulcer may predispose to carcinoma, and, though the proportion of cases in which such a malignant change takes place is now regarded as quite small, this group is nevertheless of particular importance, for here we have an opportunity to establish the diagnosis and to carry out radical treatment at a really early stage. Indeed, the improved end-results that have been claimed by some workers in recent years have been due in large part to the increasing number of cases coming to operation at a stage when the chronic ulcer has only just begun to develop malignant characteristics.

There is some evidence that achlorhydric gastritis may similarly predispose to carcinoma. This term ("gastritis" is a misnomer) implies atrophy of the gastric mucosa accompanied by complete histamine-fast achlorhydria. The condition is well known as a concomitant of pernicious anaemia, but it may occur alone. Sometimes it is a congenital abnormality but more often is acquired; it is a common finding in the later decades of life.

The proportion of patients with complete achylia who ultimately develop carcinoma is probably not large; nevertheless it is large enough to emphasize the need for particular attention in such cases in order to ensure that the development of malignancy will not be missed.

Early Symptoms

It should be emphasized that the predisposing factors just mentioned are found only in a small proportion of cases of carcinoma of the stomach, and from the point of view of early diagnosis in the generality of cases there is a danger that their importance may be overstressed. It is far more important to remember that in something like 95% of cases the patient has been in good health and entirely free from digestive disturbance prior to the development of malignant disease.

The initial symptoms of gastric carcinoma are by no means constant or characteristic, and often they are at first of quite insignificant character. In general they fall into two groups: (1) impairment of appetite with some loss of energy and a vague feeling of deterioration of health; and (2) minor digestive disturbances with vague epigastric discomfort, fluctuant distension, nausea, and perhaps vomiting. In some cases a sudden distaste for an article of food, particularly butcher's meat, is the first feature to attract the patient's attention. While such symptoms are of course far from characteristic, when they develop in a middle-aged or elderly patient the possibility of carcinoma should always be considered. The onset of vague digestive disturbances in a middle-aged man with a clear gastric history should always arouse suspicion.

Pain is not a characteristic feature. There may be no pain at all or only a mild discomfort. When present it may be felt diffusely in the epigastrium or left hypochondrium, or in the precordial region, or in the back. Only rarely is it severe at this early stage.

The pain tends to be most pronounced an hour or so after meals, but there are many exceptions to this. Unlike the pain of simple gastric ulcer, it is usually but little relieved by the taking of food. It may, however, be relieved by an alkaline powder, probably because the gas evolved leads to belching and thus brings about some reduction in tension within the stomach.

Apart from this usual clinical picture the disease sometimes shows itself by symptoms related to the precise site of the lesion. For example, a growth situated close to the cardia may give rise to symptoms like those of carcinoma of the oesophagus, with dysphagia and regurgitation immediately after swallowing. In the same way a growth situated close to the pylorus gives rise to symptoms through obstruction of that orifice, and the whole clinical picture will be that of progressive pyloric obstruction, with retention vomiting and rapid loss of weight through dehydration.

Bleeding from the growth is a common feature. There may be frank haematemesis, though this is infrequent. Much more often there is an insidious loss of blood, leading to secondary (hypochromic) anaemia, which may be severe. In such cases the main burden of the symptomatology is related directly to the anaemia, with weakness, dizziness, and shortness of breath as the chief features. In a middle-aged man gastric carcinoma is the commonest cause of an obscure anaemia.

Lastly, it is important to note that some disturbance of the action of the bowels may provide the first clinical evidence of the disease. Sometimes there is constipation, probably attributable to the reduced intake of food; or there may be post-prandial diarrhoea of gastrogenous type, resulting from the achlorhydria or perhaps from infection of the ulcerated growth. In a middle-aged person of regular bowel habit the development of constipation or diarrhoea should arouse suspicion.

Clinical Examination

It is unfortunate that in the past medical teaching has concentrated so much on the late manifestations of gastric carcinoma, such as the characters of the palpable tumour, the large liver studded with umbilicated nodules, the secondary ascites, and the presence of metastases at the umbilicus, on the pelvic floor, or at the root of the neck. Important as these features are in relation to prognosis and treatment, they do not, of course, have any bearing on the early diagnosis, while emphasis on these gross manifestations tends to obscure the fact that in the early operable stage of the disease none of them should be in evidence.

In most cases the carcinoma originates on, or close to, the lesser curvature. When a person of average build is examined in the recumbent position a growth in this situation lies deep under cover of the liver and costal margin and can be reached only with difficulty, if at all, by the palpating finger. Abdominal examination may therefore be entirely negative.

Differential Diagnosis

Peptic Ulcer

The problem of distinguishing carcinoma of the stomach from simple peptic ulcer arises in two quite distinct types of case. First, there is the patient who gives a long history of indigestion and who is suspected, or perhaps known, to have had a simple ulcer of the stomach for a considerable time. In such a patient the possibility of malignant change in the ulcer may arise—the so-called ulcer-cancer. This problem is discussed below.

Secondly, there is the patient with no previous history of indigestion, in whom the question arises: Are the recent symptoms indicative of carcinoma or are they due to the recent development of a simple peptic ulcer (gastric or duodenal)? In this latter type of case the age incidence of the two diseases is important. Simple peptic ulcer arises most often before the age of 40, and it is comparatively infrequent for simple ulcer to occur for the first time in a patient over 50; whereas in carcinoma, as is well known, the incidence increases with advancing years. Consequently, in a middle-aged person whose symptoms are of recent origin the weight of probability is on the side of malignant disease.

In simple ulcer the pain tends to be more severe than in carcinoma, its relation to the taking of food is more precise, and as a rule the relief obtained by food or alkalis is more pronounced. There are cases, however, in which the symptoms of ulcer closely mimic those of carcinoma and in which such features as loss of appetite and loss of weight add to the confusion.

In such cases much information is obtained by a thorough investigation. A duodenal ulcer can generally be excluded without much difficulty by *x*-ray examination and by means of gastric analysis, for a high acid curve is almost invariable in duodenal ulcer and quite exceptional in carcinoma. A gastric ulcer is more difficult, for the *x*-ray examination may be equivocal, while hypochlorhydria is the rule. Gastroscopy is helpful; indeed, it is in just such cases that this method of examination provides its greatest field of usefulness.

If all these methods of investigation still leave the final diagnosis in some doubt, the therapeutic test may sometimes be employed. For this purpose the patient is placed on an intensive course of medical treatment, preferably by the continuous intragastric milk drip, for three weeks, after which he is submitted to further investigation by *x*-ray examination and gastroscopy. If at the end of this time there is clear evidence of healing, the medical regimen may be continued, otherwise operation should be advised without further delay. It should be emphasized that in such doubtful cases the therapeutic test must be interpreted in the light of strictly controlled *x*-ray and gastroscopic investigations; it must not be judged on the basis of clinical features, for the symptoms of carcinoma no less than of simple ulcer may improve greatly as a result of rest in bed with adequate medication.

Ulcer-Cancer

The development of malignant change in a benign chronic ulcer of the stomach is now regarded as infrequent, but this small group of cases is of great importance from the point of view of early diagnosis. Here we have a lesion of some chronicity—often it has been present for years—with a well-established liability to malignancy. It should offer a highly favourable field for the early treatment or even the prevention of the malignant complication. Yet, lamentable as it may seem, until recent years the prognosis of ulcer-cancer has been even graver than that of a newly developed cancer of the stomach.

The reasons are not far to seek. The patient with a chronic gastric ulcer has become inured by long experience to the discomforts of indigestion and does not notice the gradual worsening of his condition. The medical attendant, accustomed to the doleful tale and sorrowful aspect, may fail to perceive the early signs of malignant change. These early signs, moreover, are by no means characteristic. The malignant transformation is heralded by no new symptoms but simply an aggravation of the existing picture. Indeed, sometimes the pain, which has been the main feature of the ulcer during its period of benignity, now actually diminishes, though more often it continues much as before, but with the notable feature that it tends to become more continuous and less constantly relieved by food or alkalis, while such features as anorexia and loss of weight gradually make themselves apparent.

Attempts have been made in the past to establish definite criteria by which the development of malignancy in a simple gastric ulcer may be recognized at an early stage, but so far no precise test has been evolved. The size of the ulcer is no longer regarded as dependable evidence, for it is recognized that many small ulcers become malignant, while some large ones, even an inch or more in diameter, remain benign. It is true that *x*-ray examination and gastroscopy will generally furnish evidence when the malignant change is well established, but only too often by this time the growth has already spread widely in the stomach wall and in the lymphatic channels.

The conclusion to which one is led by these observations is inescapable. The proper treatment of ulcer-cancer is by prophylactic surgery. In other words, it is necessary to regard all cases of chronic gastric ulcer with a critical eye, and to recommend partial gastrectomy in those in which

malignant change may be regarded as a possible development. This is particularly so if the ulcer is situated within 2 in. (5 cm.) of the pylorus or if it does not heal readily and completely (as judged by *x*-ray examination and gastroscopy) after an adequate course of medical treatment.

Achlorhydric Dyspepsia ("Chronic Gastritis")

Apart from its possible significance as a factor predisposing to gastric carcinoma, achlorhydric gastritis is of some importance in the differential diagnosis. Generally achlorhydria is without clinical effects, but when symptoms do occur they usually consist of irregular dyspepsia with anorexia, loss of energy, and perhaps some loss of weight. In most cases their long duration is enough to rule out carcinoma as the original cause of the symptoms, but it is by no means easy on clinical grounds to exclude the possibility of malignant change of recent origin. *X*-ray examination, however, will be negative, while the true diagnosis can readily be made on gastroscopy.

Other Digestive Disturbances

Symptoms suggesting gastric carcinoma arise occasionally from many other causes, such as alcoholic gastritis, chronic gall-bladder disease, or even simple constipation. They may also be mimicked by flatulent distension complicating heart failure or in uraemia or other chronic toxic processes. In all such cases *x*-ray investigation may be required to exclude carcinoma.

Anaemia

It has already been shown that the whole clinical picture of gastric carcinoma may hinge upon anaemia due to insidious loss of blood. In such cases it is fatally easy to attribute the symptoms to the anaemia, and to be content with prescribing iron or even liver extract. Examination of the stools for occult blood will, of course, point immediately to the source of the blood loss and indicate the lines of investigation to be followed, but hospital experience shows that this simple test is sometimes omitted.

The converse error of mistaking a primary anaemia for carcinoma of the stomach is equally possible but much less serious, for in such a case a full investigation will be called for, in the course of which the proper diagnosis will be reached.

Methods of Investigation

In coming to an exact diagnosis of gastric carcinoma we rely more and more on laboratory methods of investigation. To interpret them properly the practitioner should appreciate not only the scope of such investigations but also—and even more important—their limitations.

The test for *faecal occult blood* has already been mentioned as being of special value in directing attention to the source of blood loss in a patient whose presenting feature is anaemia. Its usefulness is not limited to such cases, however, and it should be performed as a routine whenever carcinoma of the stomach is suspected. A positive result indicates the presence of an ulcerative lesion in the alimentary tract, and to this extent supports the diagnosis. But it must be emphasized that a negative result carries no significance whatever, even when repeated on several occasions, for quite often a carcinoma, especially of the scirrhous variety, bleeds not at all or only at long intervals.

Gastric analysis after a test meal is established as a valuable method of investigation in obscure dyspepsias, but in the diagnosis of carcinoma it has but a limited usefulness. It is true that in most cases of carcinoma there is complete or almost complete absence of free hydrochloric acid. But complete achlorhydria may occur in health, or in association with other diseases, notably pernicious anaemia, while, conversely, a normal or even a high acid curve does not exclude carcinoma. Nor are such other features as a high content of combined acid, the presence of sarcinae, Boas–Oppler bacilli, and other organisms of positive value in the diagnosis. It is true that prolonged microscopical examination of the sediment may reveal the presence of malignant cells, and this finding admits of little doubt; but again a negative result has no significance. Gastric analysis is better omitted altogether, because of the time and trouble involved, the limited information gained, and, most important, the risk of interpreting falsely a negative result.

X-ray examination after a barium meal is, of course, the standard method of investigation, and in the hands of a competent radiologist a high degree of accuracy can be expected. Indeed, with a growth at the usual site in the lesser curvature, few methods of examination are more reliable. Difficulty arises occasionally, however, with a growth at an unusual site. Thus, a small lesion at the fundus or on the greater curve may be missed unless particular care is taken in the technical performance of the examination, while a small growth at the pylorus, giving rise to pyloric obstruction, is notoriously difficult to distinguish from a simple ulcer.

Gastroscopy has been introduced in recent years, and now holds a definite place in diagnosis, but the examination should be carried out by a specialist in this particular technique. Gastroscopy cannot be performed in all cases. It is obviously contraindicated in the presence of aortic aneurysm or cardiac enlargement, or when the thoracic spine is deformed or rigid through disease; sometimes the instrument will not readily enter the stomach, and in such circumstances to force it is to court disaster; if the growth is invading the lower end of the oesophagus the examination entails a certain risk; and finally in some cases, though the stomach is entered satisfactorily, a clear view of the pylorus cannot be achieved. Subject to these limitations, however, a great deal of information can be obtained from this method of investigation. Thus there is usually but little difficulty in distinguishing between carcinoma and a benign ulcer of the lesser curvature, while achlorhydric gastritis can be recognized at once by the thin, pale, atrophic character of the mucous membrane. Lastly, gastroscopy is sometimes the only method of examination by which, given a good view of the whole stomach, the absence of carcinoma can confidently be asserted.

Treatment

Apart from such obvious features as hepatomegaly, ascites, enlarged cervical glands, or pelvic metastases, there is no precise clinical evidence by which to determine if the tumour is capable of being removed. Formerly the site of the growth was a determining factor, and only those limited to the pyloric end of the stomach were deemed suitable for operation; but this no longer obtains, for by means of the thoracic or a combination of the abdominal and thoracic approaches the fundus and cardia are equally accessible. The size of the tumour is not a reliable criterion, for the main factor determining operability is the extent of lymphatic spread, and in this respect the large fungating tumour is sometimes less aggressive than the small scirrhous growth.

X-ray examination may provide valuable evidence. In some cases the fixity of the growth, as judged on screen

examination, may preclude operation; in others the lesser curvature may be visibly distorted by enlarged glands in the lesser omentum.

Such precise evidence is not often available, however, and in most cases the decision to operate is based more on hope than on expectation that resection will be possible.

Palliative Treatment.—As a rule the most distressing features in inoperable cases are retching, nausea, and vomiting, due in part to obstruction of the gastric pathway and in part to infection of the fungating growth. Much relief may be obtained in such cases by gastric lavage. For this purpose a stomach tube should be chosen of diameter midway between a Ryle's tube and one of full size. A No. 16 size is most satisfactory, for it can be introduced with little discomfort and yet is large enough to permit evacuation of blood clot and debris. A dilute solution of sodium bicarbonate may be used for the lavage, which may be performed daily, or even twice daily, with benefit.

PROGRESS IN CANCER RESEARCH

ANNUAL REPORT OF B.E.C.C.

The 27th annual report of the British Empire Cancer Campaign covering the year 1949 was presented on July 12 at the annual meeting of the Campaign, over which the Duke of Gloucester presided. The editor of the report, Sir Heneage Ogilvie, summarizes the year's work as "steady progress," research having been conducted at an increasing pace.

Evidence has been accumulated at the Chester Beatty Research Institute to substantiate the carcinogenic action of the aromatic nitrogen mustards. Work at the Animal Supply and Research Units of the B.E.C.C. has shown that mammary-tumour tissue of the mouse has a higher content of the enzyme β-glucuronidase than healthy breast tissue.

It has been confirmed at Leeds University Department of Experimental Pathology and Cancer Research that tissue from mouse sarcomata can be frozen and dried and yet retain the capacity to reproduce the same type of tumour in susceptible animals. But it was considered that this may not constitute evidence of the existence of a virus as the infective agent, for sarcoma cells may survive freezing and desiccation in the presence of 5.3% glucose. If this is the case, the resulting tumours may be directly derived from the surviving cells. Work also carried out at Leeds does not suggest that mothers of breast-cancer patients are more liable to cancer in general, or that they are more liable to cancer of the breast than the average woman in England and Wales.

Chemotherapy

From the Westminster Hospital considerable improvement, in some cases lasting two years, is reported in certain cases of carcinoma of the breast with widespread visceral and skeletal metastases treated with large doses of testosterone propionate. The effects of hormones in cases of advanced cancer of the breast are being investigated at Guy's Hospital. As a general rule, young patients with skeletal deposits are given androgens, and old patients with soft tissue deposits are given oestrogens.

At the Christie Hospital and Holt Radium Institute nitrogen mustard continues to be used in the treatment of Hodgkin's disease, particularly when the disease is so widespread that *x*-ray therapy would probably fail to palliate the symptoms much. In apparently very early cases when the disease is localized to one region nitrogen mustard is followed up by *x*-ray therapy. The Courtauld Institute of Biochemistry continues to investigate the effects of teropterin on tumour growth. Some degree of inhibition has been obtained in animal experiments with a-methopterin, a folic acid antagonist.

Cancer of the Lung

Analysis of samples of air for benzpyrene is being carried out at St. Bartholomew's Hospital, and it is hoped to improve the technique of sampling. No evidence has yet been found of the formation of benzpyrene by the combustion of tobacco. Experiments are also being carried out to determine the amount of arsenic in tobacco, and how much of it is inhaled. A wide variation in different brands of tobacco has been found. The most likely source of the arsenic seems to be the insecticides with which the plants are sprayed.

THE POPULAR LECTURE

EPIDEMICS, OLD AND NEW

The final event of the Annual Meeting at Liverpool was the Popular Lecture, which was delivered in the evening of July 21, in the Picton Hall, to an audience of about 250. The President, Sir Henry Cohen, was in the chair. The lecturer was Dr. C. O. Stallybrass, and his subject was "Epidemics, Old and New." The lecture was illustrated by lantern-slides.

Dr. Stallybrass began by reminding his audience of some of the great pestilences of the past. Pestilence had often followed in the wake of military operations and had thwarted such operations. Again, the first attempt to pierce the Isthmus of Panama was defeated, not by engineering difficulties, but by malaria and yellow fever, and not until the studies of Laveran and of Manson and Ross, who laid bare the part played by mosquitoes in the spread of malaria, and of Reed, Carroll, and Lazear (the last of whom died in these researches), who showed that yellow fever also was conveyed only by certain mosquitoes, did the piercing of the isthmus become possible and the Tropics become habitable by white peoples. Men of all nations had combined in the unending warfare against disease, and thanks to them the average span of life had been lengthened by tens of years.

In the combat against a particular epidemic disease account must be taken of its individual characteristics. Without such knowledge campaign after campaign had failed. The lecturer took as an example typhus fever, the scourge of every sustained military campaign for 500 years. In 1528 the French army besieging Naples was turned back by typhus, 30,000 soldiers being struck down. Spanish soldiers conveyed it to Mexico, with devastating effects. During the Thirty Years' War (1618–1648) typhus had its widest diffusion, Germany suffering the most. Russia and Poland for long harboured typhus. Between 1816 and 1819 some 700,000 cases of typhus were said to have occurred in Ireland. In Liverpool, when Duncan, the first medical officer of health, was appointed 103 years ago, typhus was rampant. Duncan and his successors waged a somewhat unsuccessful war against typhus for 70 years, for they were fighting in the dark. The last indigenous cases of typhus in Liverpool were in 1918, but the lecturer saw a further small group of cases in Birkenhead in 1921, the infection having been derived from Glasgow. But by this time the method by which typhus was conveyed by lice was known, and the germ, the *Rickettsia prowazeki*, named after its two independent discoverers, Ricketts, an American, and von Prowazek, an Austrian, had been found. Both these men died of typhus in the course of their studies.

Serbia, after having turned back the Austrian army in 1915, was overcome by typhus—a more powerful foe—and 150,000 fell ill in six months. General Hunter, of the British Army, was seconded to Serbia, and in a few months' scientific campaign he had eradicated the disease, so much so that when in 1916 the lecturer was in charge of the beds for infectious disease in the Serbian Army he never saw a case. Even greater success attended the efforts of the United Nations in the second world war, when typhus broke out in Naples but was rapidly controlled. There was a threatening situation at the end of the war when the inmates of concentration and prisoner-of-war camps were released, but by that time D.D.T. and other chemicals to destroy

lice and other insects had been discovered. The deadly tropical typhus to which troops in Burma and elsewhere were exposed required other methods of control, largely anti-typhus vaccines, but also insect repellents, such as butyl phthalate. A large laboratory was set up in England to produce this vaccine, and within 100 days the vaccine was being delivered—an example of what Government departments could do when spurred by necessity.

Control of Epidemic Disease

Modern methods of control of epidemic disease involved: (1) ascertainment and notification to the local authority and to the Ministry of Health of all cases; (2) adequate isolation of all cases; (3) control and surveillance of all known contacts, including doctors and nurses; (4) immunization, by vaccine, of all known contacts, or, if the disease had become prevalent, of the whole population. These methods over and over again had been shown to be adequate to control importations of the most virulent types of smallpox, and they had been most effectively applied, with appropriate modification, to other diseases.

In one group of diseases, such as typhoid fever, dysentery, and cholera, the germs were present in excreta and could be conveyed by fingers and flies to food, infection often occurring in epidemic form by means of water, milk, ice-cream, or other foodstuffs. This group of alimentary diseases had been largely controlled by sanitation. Cholera had been eradicated in many parts of the world; typhoid fever and the severer forms of dysentery were on the verge of extinction in this country; deaths from infantile diarrhoea had been enormously reduced. Food-poisoning, however, though seldom fatal, was far too prevalent.

Plague in history was foremost among epidemic diseases. In London in 1665 the only isolation possible was to shut up sick and healthy in the stricken house and inscribe the doorway with a cross. The "Black Death" which smote Europe in the middle of the fourteenth century was the heaviest infliction which history had recorded. In this country in 1352 Oxford lost two-thirds of her academic population. The Abbé Gasquet estimated that the population of England was reduced by half. In 1894 plague broke out in China and spread via India to the ports of every continent. But Pasteur had not lived in vain. The plague bacillus was discovered in that year, and almost simultaneously the suggestion was made that plague was conveyed by fleas. The British Royal Commission on Plague reported in 1907 that plague was conveyed by the rat flea *Xenopsylla cheopis*, and the final proof of flea-borne conveyance was given by Martin and Bacot. Haffkine (a Russian) produced a plague vaccine the use of which in threatened populations greatly reduced the mortality.

Victory over Diphtheria

One more victory which had been won within the last thirty years was over diphtheria. Schick in Vienna in 1913 introduced his skin test. The lecturer recounted the steps taken in the prevention of diphtheria, and said that in 1941 there were no fewer than 800 beds in Liverpool hospitals occupied by diphtheria cases, and to-day there were only half a dozen, so well had this campaign of immunization been carried out in their city.

During the war the Ministry of Health started a national drive for the prevention of diphtheria by toxoid inoculation; this should be done in infancy, since that was the age at which diphtheria was most fatal, as was the case with many other epidemic diseases. The broadcasts given by Sir Wilson Jameson, then Chief Medical Officer of the Ministry of Health, were notable events, and were always followed by an increased number of parents seeking inoculation for their children. One lesson to be learnt from this was that for the prevention of widespread disease a national campaign led by the Ministry of Health was essential.

Great as were the victories which had been achieved, there were two diseases, both of infective origin, which remained unconquered—namely, rheumatic heart disease and tuberculosis. Both took a large toll of adolescents and young adults. Of cardiac rheumatism it could only be said that too little was known for anything effectual to be done. It was a disease caused by sensitization to the poisons of the streptococcus, about which basic knowledge was still slight. There was no doubt that heredity played a part in the condition. Here was a case for research, most of which was being carried on in the United States. Could not Britain play a larger part?

There might be some surprise at his inclusion of tuberculosis among epidemic diseases. But it could occur in outbreaks among races which had never been exposed to it. In Bunyan's day tuberculosis was "captain of the men of death," but it had now given place to heart disease, of which the rheumatic type was the principal one in the first half of life. In 1871–80 in Liverpool tuberculosis caused 13.5% of all deaths, but in 1948 it still caused nearly 8%. Every year over 20,000 persons in England and Wales died from tuberculosis—400 a week. King Edward VII said 50 years ago, "If preventable, why not prevented?" Why not, indeed?

The Prevention of Tuberculosis

Such prevention was no easy task. The downward trend of tuberculosis had been stayed and reversed by two wars, and it did not appear that the fall had really been resumed. The downward trend in the last century was shown to be closely associated with the rise in the real value of wages earned, this in turn being dependent largely upon the increased productivity of the machine. Tuberculosis was primarily an infective disease, and emphasis should be laid upon prevention. The preventive measures to be taken were: (1) discovery of cases; (2) isolation of cases so far as possible; (3) control of contacts; (4) immunization of contacts of those most exposed or specially susceptible. Ascertainment was the first necessity, just as it was with smallpox. The lecturer suggested that the mass radiography service should be available to every doctor in practice who had any suspicion of pulmonary disease in his patient. But mere ascertainment without the other measures of combat would achieve nothing.

The amount of sanatorium accommodation which appeared to be adequate before the war was not so now. The average length of stay in hospital had been considerably prolonged, for which improved methods of treatment by drugs such as streptomycin and "P.A.S." and the developments of thoracic surgery had been a major cause. It was notable that patients staying in hospital for as long as two years continued to gain in weight even up to the end of that period. More beds for tuberculosis were required, and their provision should be given high priority. He agreed with *The Times* that the long waiting-lists for treatment were a "raging scandal." Each general hospital should make provision for the treatment of tuberculosis. The shortage of nurses in sanatoria was one of the causes of long waiting-lists. It had been stated at times, quite erroneously, that there were special risks for nurses in sanatoria. That never was true, so far as he knew after 20 years spent in sanatorium administration; now, on the contrary, if a nurse or medical student was given B.C.G. a really considerable degree of protection was afforded.

Tuberculosis, the lecturer continued, was specially prone to attack those who were overcrowded or ill-housed. Most local authorities gave high priority to tuberculosis cases, but if re-housing meant increased rent this might mean worse feeding just at the very time when good nutrition was most desirable. There was here a strong case for some special subsidy.

Families of patients suffering from tuberculosis should be kept under observation, perhaps for years. They should be examined radiologically at appropriate intervals. Their susceptibility to infection should be judged by the Mantoux or similar test. All these methods of care and prevention were time-consuming, and the present anti-tuberculosis staffs were too small. If a lesson were taken from Copenhagen, where tuberculous meningitis had been almost entirely prevented, three times the present staff was needed. If as much time as was now devoted to the treatment of tuberculous meningitis—which often failed—were given to its prevention there would be fewer cases to treat.

Call for a Whole-hearted National Effort

Finally, Dr. Stallybrass spoke of the immense field of prevention made possible by the availability of B.C.G. B.C.G. vaccine was a living avirulent bovine bacillus which, as the conference in Washington in 1946 declared, conferred increased resistance to tuberculosis. There were no proved cases of progressive disease as a result of B.C.G. vaccine. A general campaign of B.C.G. vaccination in the Danish island of Bornholm almost eliminated, subsequently, the cases at ages 15–30 years which formed so large and tragic a part of the tuberculosis picture in many countries.

This country was falling behind the Scandinavian countries and such small island territories as Iceland and the Faroe Islands in the anti-tuberculosis campaign. He suggested the following measures: (1) overhaul, reorganization, and expansion of the tuberculosis section of the Ministry of Health; (2) a strong lead from the Ministry to local authorities, such as was given in regard to diphtheria, with new emphasis on prevention and on the need for priority in building construction to sanatoria and clinics; (3) considerable additions to the medical, nursing, and social staffs engaged in tuberculosis prevention work; (4) arrangements for the protection of nurses, doctors, and tuberculin-negative contacts of cases of tuberculosis, especially the newborn, by use of B.C.G.; (5) special housing facilities for tuberculous families, together with, possibly, financial subsidy; and (6) speeding up of the building of Remploy factories for the ex-sanatorium patient. Dr. Stallybrass ended by calling for a sustained all-out national effort to reduce and finally eradicate tuberculosis.

Nova et Vetera

BIOGRAPHY OF EHRLICH

Paul Ehrlich. By Martha Marquardt. With introduction by Sir Henry Dale, O.M., G.B.E., M.D., F.R.S. (Pp. 255; illustrated. £1 5s.) London: William Heinemann Medical Books. 1949.

Paul Erhlich was born in a small town of Upper Silesia, son of a Jewish innkeeper. From his adolescent days he showed not so much genius as "dedication"; for his mind was directed towards an end to which all else in him was, through life, completely subordinate. It was a period of rapid scientific industrial development, especially evident in Germany in the output of "fine chemicals" and, notably for Erhlich's career, of aniline dyes. Certain of these soon came to be used as tissue-stains by microscopists, among whom was his older relative, Karl Weigert, a name still linked with a histological method. The chemical outlook was making itself felt in German medicine. From the first it was Ehrlich's idea to adapt the chemical affinities of certain substances for certain cell-elements to curative purposes. To this task he brought an astonishing persistence, great inventiveness, endless resource, and exceptional knowledge. He began with aniline stains, did work of great importance on the blood, and, extending his master-idea, sought and found various specific agents against specific cells—"magic bullets," as he called them—chosen always to hit the parasite as hard as possible and leave the host as uninjured as might be. His most spectacular triumph, as all know, was "606" for the spirochaete of syphilis. In the course of his work he developed views on the nature of immunity the discussion of which has been extremely fruitful for the medical outlook.

Ehrlich was a very odd character. Miss Marquardt, his devoted secretary for many years, discusses his manner of work and some of his moods and social relationships. Parts of the account, if not related by so faithful a witness and confirmed by others, might be thought fanciful. His life in the laboratory alternated between states of intense concentration and extreme excitement. From these his only relief was the smoking of strong cigars—a score or more a day—and the drinking of mineral water. He had no special interests in literature, art, music, politics, philosophy, religion, nor indeed, so far as can be seen, in science as a whole. Sport, travel, adventure, scenery, never kept him from his laboratory. He had no gift of exposition and was a poor speaker. His social relationships reveal a generous, charitable, and kindly soul, but the tempo of his life and the bent of his mind left little time for mundane or indeed for human affairs. He lived in his laboratory and for his own particular part of his own particular science. His achievements were set forth by his colleagues on his 60th birthday, in 1914. His life was externally so uneventful that there is hardly room for a biography in the usual sense.

Sir Henry Dale writes in his introduction that "the lines of research which Ehrlich opened to explorers have provided an impulse for that . . . revolutionary change in the . . . treatment of infections which stands out as one of the great achievements of the half-century now ending"; and, again, that those who did not know Ehrlich will find it "difficult to believe that anybody could do great work at such a pitch of excitement and explosive emotions." These matters inevitably raise reflection on the kind of men that make discoveries. For there is no human power or faculty that has not been used, and may not yet be used, in the service of science. Men of science are thus as various in character and outlook as mankind itself. The one thing that they have in common is their way of demonstrating their conclusions. Though we may smile at Ehrlich's wayward conduct and child-like outbursts, at his limitations, his vanities, and his incoherences, yet whenever he was putting his work to the test of demonstration he exhibited such extreme caution as has been excelled by none of his great scientific compeers. Miss Marquardt illustrates again the endless variety of human character which, by some miracle, is yet subsumed under one pattern of humanity. Man is, after all, essentially a social animal and must, in the end, be judged by social standards. It is a theme that will never lose its fascination, for the proper study of Mankind is Man—the best of all maxims for medical men—

> "Sole judge of truth, in endless error hurled:
> The glory, jest, and riddle of the world."

CHARLES SINGER.

The annual report of the Oxford Regional Hospital Board for the year ended March 31, 1950, has recently been published. The revised estimates of the gross expenditure of the board and the sixteen hospital management committees for the year 1949–50, as approved by the Minister of Health, amounted to £5,189,915. Against this should be offset the estimated income of hospital management committees amounting to £475,573, leaving a net figure of £4,714,342. The report states: "This, it should be noted, is not the actual expenditure, which is expected to be rather less than that sum, but the estimated expenditure, arrived at after the most careful scrutiny both by the board and by management committees. Of this total, £42,540 represented the board's central administration expenses, and £526,623 was for expenditure by the board other than on administration or hospital maintenance (the main items being specialists' salaries, the blood transfusion service, mass radiography units, and contractual arrangements for the treatment of patients at institutions outside the National Health Service). The remaining £4,145,179 was the net expenditure of hospital management committees on the day-to-day running of the 101 hospitals and 45 clinics in the region. The sum allocated to the regional hospital board for capital works of all kinds amounted to £225,000. When it is remembered that the board inherited from predecessor authorities works in progress at two hospitals alone amounting to £240,000, it will be appreciated that the board is faced with an almost impossible situation. The list of schemes already in hand more than absorbs the whole of the capital sum available for 1950–1; schemes totalling nearly £3,500,000 on works required as both urgent and important await their turn on the priority list: and beyond this again major development schemes total approximately £7,000,000. Under these circumstances the extent to which the board is likely to be able to improve and extend existing facilities is negligible, and every management committee in the region will have to be disappointed because of the board's inability to proceed with some vitally important project in its area."

ONE HUNDRED AND EIGHTEENTH ANNUAL MEETING

of the

British Medical Association

HELD AT LIVERPOOL AND SOUTHPORT
JULY, 1950

THE SECTIONS

SUMMARY OF PROCEEDINGS

SECTION OF MEDICINE

Tuesday, July 18

Cardiac Failure

With the president, Dr. E. N. CHAMBERLAIN, in the chair, Professor E. P. SHARPEY-SCHAFER (London) opened the discussion at the Section of Medicine on Tuesday, July 18, on the modern conception and therapeutics of cardiac failure. Professor Sharpey-Schafer defined cardiac failure as the failure of the pump to pump in a proper manner. Where the pressure rose in the inferior vena cava, the blood pressure rose, and there was capillary dilatation in the musoles, with consequent collapse. He excluded from discussion the myxoedematous patient who has a hot bath ; in that case there was dilatation of the peripheral vessels, which were normally constricted, resulting in fall of cardiac output and fall of blood pressure.

In ordinary clinical congestive heart failure he thought that the height of the venous pressure was a factor of the greatest importance. He showed graphs which correlated cardiac output with venous pressure, and showed that in the normal heart when the venous pressure rose the cardiac output rose also. But in diseases such as valvular heart disease and hypertensive heart disease where there was a low output, if the venous pressure rose the cardiac output fell. In diseases where there was a high output, such as anaemia, cor pulmonale, liver disease, and arterio-venous shunts, the rise in venous pressure was often not associated with the rise in cardiac output. In the low-output hearts, when the heart rate rose abnormally there was also a drop in cardiac output.

Discussing left-side failure, he said that in the acute attack the venous pressure was high, the muscle vessels constricted, and the blood pressure raised. There was a vicious circle in which rising venous pressure caused rising blood pressure, which threw more work on the cardiac muscle. Rising venous pressure also normally caused the blood vessels in the muscles to constrict, and this caused further rising of the venous pressure. Dyspnoea also caused rising of the venous pressure. Venous pressure could also be raised by such methods as transfusion and lowered by venesection. Posture also had an important influence on venous pressure. In normal individuals the venous pressure fell when the person stood upright, but in cases of heart failure the reverse happened. He therefore advised that in treating acute heart failure the most important agents for lowering venous pressure were posture, spinal analgesia, venesection, and drugs such as theophylline, morphine, and digitalis. It was also important to increase the water and salt excretion.

Therapy was essentially directed to removing the cause of the high cardiac output. Surgery might achieve this in a small group of cases of mitral stenosis. Palliative methods included the giving of large doses of thiouracil over a long period in order to cause thyroid deficiency, while in some cases tricuspid incompetence might be produced surgically.

Dr. R. I. S. BAYLISS (London) discussed the problem of pulmonary hypertension, which was influenced by cardiac output and pulmonary resistance. In emphysema, hypertension might result from the obliteration of a large number of pulmonary capillaries, but the number would have to be very high, for it did not occur after pneumonectomy. Sclerosis of the pulmonary vessels might be a factor, but it was probable that the failure of the vascular bed to dilate on exercise played an important part. Oxygen caused a reduction in pulmonary arterial pressure. In emphysema there were high cardiac output, oxygen lack, and changes in the pulmonary vascular field. In mitral stenosis, on the other hand, there was a rise in pulmonary pressure only when failure occurred. Here the cardiac output was not high, there was no oxygen lack, but the stenosis of the mitral valve caused engorgement of the pulmonary veins and capillaries.

In three cases of pulmonary hypertension in patients with mitral stenosis who had died necropsy had shown sclerosis of the pulmonary vessels. The sclerosis might partially have accounted for the heart failure. If it occurred in many cases of mitral stenosis it might render surgery in the disease ineffective. This was unlikely, since only a few vessels were involved. The answer would not be known until the patients who had already had the operation had survived for a long enough time for study.

Dr. PAUL WOOD (London) said it was possible to detect raised venous pressure clinically at the bedside. It could occur in seven groups of conditions without heart failure being present. These conditions were:

(1) In a normal heart if the patient was lying flat and in women in the premenstrual period. There would, however, be no evidence of pulsation above the sternal angle if the patient was raised to 45 degrees.

(2) With a giant " a " wave, such as occurred in cases of tricuspid stenosis, pulmonary stenosis, and pulmonary hypertension.

(3) In cases of tricuspid incompetence, where the venous pulsation was systolic.

(4) In Pick's disease and pericardial effusion, which could be diagnosed by passing a cardiac catheter and observing that the tip was a distance away from the wall of the auricle, whereas in heart failure it would be against it.

(5) In high output state, such as in Paget's disease, where it might be very difficult to decide if the ventricle was overloaded.

(6) In sinus bradycardia and heart block, where there was overfilling of the heart to compensate for the slow rate.

(7) In massive pulmonary embolism.

Agents for lowering venous pressure were not needed in these seven groups of cases.

In the treatment of heart failure the most important measure was rest in bed in a posture in which the legs were low. It was not possible to nurse a patient in a chair, since he would develop bed-sores. Digitalis was of great value, but he did not agree with Professor Sharpey-Schafer that it acted by lowering the venous pressure. He showed that in twelve conditions in which there was a high-output state it had no effect in this direction. He thought that its principal effects were as a pulse-slowing agent, a diuretic, and an arteriolar-constricting agent. Because of this last effect it was dangerous in acute left-sided failure. He thought that mercurial diuretics acted by causing sodium to be excreted, and a low-sodium diet was much more effective, particularly in left ventricular failure. It was dangerous to combine mercurial diuretics with a low-sodium diet, since uraemia resulted.

Clinical Examination

Dr. WILLIAM EVANS (London) said that there was another way to judge the effects of a specific remedy on the heart—namely, the clinical way, gained by paying heed to the patient's breathing, examining the pulse, auscultation over the lung bases, watching the height of the venous column in the neck, estimating the size of the liver, seeking the presence of ascites or of

oedema, and measuring the urinary output. When such clinical signs improved from the giving of digitalis he confessed to an indifference to knowing whether such effects had been brought about by a reduction of the right auricular pressure or an increase in the cardiac output. Indeed he inferred that such events took place when the clinical signs of heart failure disappeared as the result of successful therapy.

It was conditional of good doctoring that, so long as a laboratory test could supply only information the interpretation of which was in doubt, discomfiture connected with an extravagant investigation should never be imposed on a patient already under the burden of an illness. So long as some doubt remained on the precise action of digitalis in heart failure from different causes, he gained satisfaction from the definition given by a nursing sister years ago: "Digitalis slows the rate and lengthens the pause, enabling the heart to gain nutrition from an improved circulation."

Rapid digitalization, he said, was not often needed, but if such an effect was desired it was best brought about by giving 2.5 mg. of digoxin by mouth. For continuous digitalization the best preparation was the leaf. A sound plan was to use a constant single dose—namely, 1 gr. (65 mg.) in the case of the leaf, and to vary the daily dosage, which should be determined in every patient following a clinical trial.

The ventricular rate in auricular fibrillation could not be a guide to digitalis dosage, for it varied from patient to patient, but it was fairly constant for the individual patient, so that when the heart rate during ideal digitalization was known for a patient it might be accepted as a reliable index for the proper dose. Digitalis did as well in heart failure with normal rhythm as with auricular fibrillation provided the cause of the failure allowed for temporary improvement. Thus, the onset of failure in emphysema was an ominous sign, and that was why digitalis was not expected to produce and maintain improvement, although it often did this and its clinical trial should never be withheld. In failure following cardiac infarction, too, digitalis should never be denied to a patient on the grounds that it might precipitate ventricular fibrillation, for it usually brought unexpected benefit. Quinidine need not be given in cases of cardiac infarction with the object of preventing ventricular fibrillation, for if the infarct was large enough to induce this malignant form of arrhythmia no amount of quinidine would annul it.

A salt-free diet was difficult to prepare and to obtain; it was distasteful to most patients with a protracted illness, and its benefit was hardly greater than that obtained from a diminished fluid intake of about two pints daily and avoiding the addition of salt to the plate. It was worth trying in cases of heart failure where ascites needed repeated paracentesis; uraemia could sometimes follow in its train. A diminished fluid diet should contain an adequate amount of vitamin C.

Of the mercurial diuretics "neptal" and "esidrone" had proved to be best in a controlled clinical trial. The dose was 2 ml., and it was less painful and more efficient if given intravenously. Accentuation of the diuresis was best effected by 30 gr. (2 g.) (four tablets of 7½ gr. (0.5 g.) each) of ammonium chloride given two hours before the mercurial preparation. A mercurial diuretic was seldom needed oftener than once a week after the first fortnight. Three neptal tablets by mouth were worth trying in every patient so that they might replace an injection on occasion should they induce by themselves a moderate diuretic response; they acted better than a suppository. Mercurial diuretics should never be given intravenously to a patient with nephritis until a good diuretic response had first been obtained from an intramuscular injection. When the diuresis diminished from successive injections in a patient with heart failure the dose should be reduced and not increased.

In the discussion, Dr. D. J. THOMAS (Melbourne) pointed out that the psychological outlook of the patient was of the greatest importance in the treatment of heart failure. Dr. P. T. J. O'FARRELL (Dublin) did not think there was any advantage in restricting fluids. It was important to get the patient ambulatory as early as possible. There were diuretics less toxic than neptal. Dr. E. WYN JONES (Liverpool) said it was important that fluids given in heart failure should be of normal temperature, and cited two recent cases where the giving of ice-cold drinks had precipitated a severe anginal pain.

In answer to questions, Dr. PAUL WOOD said that by a low-sodium diet he meant one consisting of fresh fruit juice, milk, and rice, and which contained not more than 0.3 g. of sodium a day.

SECTION OF SURGERY

Tuesday, July 18

Varicose Ulceration

The president, Professor CHARLES WELLS (Liverpool), welcomed the visitors to Liverpool and, after a few introductory remarks, invited the vice-president, Mr. J. B. OLDHAM, to take the chair for the ensuing discussion. Dr. GUNNAR BAUER (Mariestad, Sweden), opening the discussion, confined his remarks to a consideration of the value of popliteal vein ligation in the treatment of so-called varicose ulceration. He pointed out that the ulceration was nearly always associated with chronic oedema, skin induration, and bursting pain, and described these three components as comprising the lower-leg-stasis syndrome. Although this problem had baffled the profession for many years Dr. Bauer said that there had been considerable advances in our understanding of this problem during the last decade: he referred to his own investigation of these cases by the technique of retrograde phlebography, and emphasized the importance of destruction of the valves in the deep veins, either by thrombosis or phlebosclerotic processes, as a cause of this syndrome. Popliteal vein ligation had been devised at the Mariestad Hospital as a means of remedying the retrograde flow in the deep veins, and Dr. Bauer proceeded to discuss the results which he had obtained in these cases, emphasizing that it was still too early to make any final assessment of the true value of this operation, which he had performed 245 times. It seemed to be free from risk. The immediate results were favourable and there had been no deaths or complications. A follow-up had been made of 196 cases between six months and three years after operation, and in 84% the ulcers had remained healed and the patients were free from stasis symptoms. Of the 16% of cases where recurrent trouble had occurred during this follow-up period, in almost two-thirds this had seemed to be due to persistent incompetent veins in the superficial system, while in the majority of the remaining cases there was evidence of arterial insufficiency. In the former group Dr. Bauer advocated ligation of the incompetent superficial veins, and, if the indications for both procedures were clear, he saw no objection to combining both deep and superficial vein ligation in the same operation.

Professor A. M. BOYD (Manchester) said that this problem would be solved only by organized effort. Mr. J. B. Oldham had already pointed out that it had been estimated that 5 in every 1,000 of the working population of this country were suffering from this affliction, and Professor Boyd believed that there were probably 50,000 cases within a 50-mile radius of Manchester. He went on to point out the differences between the three main types of so-called varicose ulcer. First, the ulcer due to varicose veins alone never penetrated the deep fascia; it was often associated with pigmentation and never with oedema, and a prominent "feeding" vein was usually apparent. Secondly, the post-phlebitic ulcer was often much deeper, and was commonly accompanied by oedema and the other features mentioned by Dr. Bauer. The third group of ulcers, due to arteriosclerosis, were always deep and, unlike the varicose vein and post-phlebitic ones, they were commonly situated on the anterior or antero-lateral surface of the leg. Professor Boyd said that the post-phlebitic type of ulcer was undoubtedly the most common and important variety, and he mentioned the various complications which might add to the difficulties in treatment. Periostitis was sometimes a cause of recurrences and was often an indication for amputation. Fibrosis at the base of the ulcer not only delayed healing but commonly led to constriction of the limb and aggravation of the venous stasis. Lymphatic infections similarly increased the surrounding induration, and, finally, malignant changes

supervened in some cases. He mentioned the dangers of retrograde injection of varicose veins and demonstrated his point by reference to some phlebograms.

Investigation and Treatment

Turning to the investigation of these cases, Professor Boyd emphasized the importance of studying the bacteriology of the ulcer exudate. Ascending and descending phlebograms and, in some cases, arteriograms were useful. He then dealt in turn with the management of oedema, the control of infection, the value of sympathectomy, and the place of skin-grafting. He believed that elevation of the legs on wedge mattresses was a useful way of dispersing oedema. In his experience the local application of streptomycin, using a solution containing 1 g. per litre, was the best method of eliminating infection. While differences of opinion had been expressed on the value of sympathectomy he thought that, as the majority of cases occurred in the fifth decade and as multiple aetiological factors were operative in many of them, sympathectomy was often of value. He emphasized the importance of removing the first as well as the second and third lumbar ganglia, as it was important for the sympathectomy to include that skin area on the inner side of the leg where these ulcers were most prone to occur. The resultant drying of the skin was, in his opinion, an important factor in diminishing the possibilities of recurrent ulceration. He thought that skin-grafting was always essential for rapid healing and stated that it was important to excise the fibrous base of the ulcer rather than to graft on the granulations. Professor Boyd concluded by saying that 50% of the cases treated in his unit had recurred after two years, but that 90% of the cases which had had a lumbar ganglionectomy remained healed. He thought that personal hygiene was the most important factor in determining whether an ulcer remained healed, and that in post-phlebitic cases the incidence of ulceration was incomparably higher in the lower-income group.

Mr. A. C. BREWER (Liverpool) described the importance of arterio-venous shunts, which, he believed, were a most important cause of the vascular insufficiency responsible for these ulcers. He thought that arteriograms were of much more importance than phlebograms, and demonstrated how, by using a standard technique and taking the pictures at a constant time after the injection of the radio-opaque medium, it could be seen that blood was rapidly transferred from the arteries to the veins. This arterio-venous shunt was due to the opening up of endothelial channels which are present in the lower limb but are not normally used in adult life, and ulcers due to this cause are best treated by some form of vein ligation. Mr. Brewer believed that arterial insufficiency might follow a deep venous thrombosis, and sympathectomy was indicated in these cases.

The Importance of Bandaging

Dr. STUART MCAUSLAND (Liverpool) emphasized the fundamental importance of firm occlusive bandaging. This was a method which kept the patient on his feet and had a threefold application. First, it was the only treatment of value in those cases where operative treatment was either not needed or not acceptable to the patient; secondly, it was important as an adjuvant to surgery; and, lastly, it was essential after surgical intervention, whether or not the latter had proved successful. Dr. McAusland said that it was unfortunately still too true that simple occlusive bandaging methods are neither sufficiently well known nor properly practised. He showed a short colour film illustrating the detailed technique of pressure bandaging. He also demonstrated the proper methods of application of adhesive and of elastic bandages, the use of rubber pressure pads over the ulcer and beneath the malleoli, and the value of applying strapping across the ulcer to hasten its healing.

The discussion was continued by several other speakers. Mr. MAURICE LEE (London) described a method of weaving strips of skin through the granulations of an ulcer, a method which he was accustomed to apply in the out-patient department. Mr. A. J. WALKER (Leeds) stated that he had not found retrograde phlebograms so reliable as investigation of the pressures in the veins of the foot. He demonstrated how changes in the venous pressure on exercise could assist in the diagnosis of venous insufficiency states, and continued by discussing the results of popliteal vein ligation in 30 cases. The follow-up had extended over three to fifteen months, and, while bursting pain had been abolished in 80% of cases, the ulcers had remained healed in only 64% of cases. He thought that popliteal vein ligation should be offered to all cases with severe bursting pain, but, so far as the ulcer was concerned, he doubted whether this operation did little more good than adequate external support.

Need for Missionary Zeal

Mr. A. DICKSON WRIGHT (London) said that this was a subject in which he had been interested for very many years. Personal attention was of the very greatest importance if treatment was to be successful, and he emphasized the importance of a missionary zeal in dealing with these cases. Varicose ulceration in women was a very special problem, since few of these patients either could or would submit to procedures which necessitated a prolonged spell in hospital. Ambulatory treatment with expert bandaging was certainly the most important and generally applicable method. He thought that sympathectomy was by no means so generally or so widely applicable as Professor Boyd had inferred, and he was not satisfied that there was any clear understanding of the indications for popliteal vein ligation. He thought that surgeons should not forget the cases which were made worse by these procedures. As to the assessment of recurrence rates, many of his cases treated by bandaging alone had remained healed for more than ten years, and he thought that they should therefore be most cautious in estimating the value of these newly advocated procedures. Mr. Brewer had referred to the possible importance of arterio-venous shunts, and Mr. Dickson Wright remarked that the profession was becoming shunt-minded; the important problem was, however, to decide how to control such shunts.

Mr. J. B. OLDHAM (Liverpool) said it was apparent that surgeons were only skimming the fringe of these cases. He pointed out that this was a mechanical rather than an infective problem, and underlined the dangers of sulphonamides and penicillin. He thought there was no real virtue in confining the patient to bed, and he agreed with Professor Boyd's remarks about the dangers of retrograde injection of varicose veins.

Professor BOYD, in reply to various questions, said that it was their practice to provide patients with elastic stockings after operation. He thought that the common denominator of all successful methods of treatment was a high standard of personal care. He did not agree with Mr. Dickson Wright's strictures on the possible ill effects of sympathectomy and vein ligation, and said that it was logical to remedy the underlying defect as a part of the treatment. Referring to the various special investigations already mentioned, Professor Boyd emphasized that these were not essential in the majority of cases and one could rely on clinical assessment. He thought the simple tourniquet test of great value. Dr. GUNNAR BAUER said that they did not now use retrograde phlebograms routinely. In his clinic they had measured venous pressures, but only with the patient at rest on the operation table. He invariably provided his patients with bandage supports after operation and tried to keep his patients in hospital until their ulcers were healed. He did not really know what to say about the value of sympathectomy and thought that perhaps the results varied under different climatic conditions.

SECTION OF OBSTETRICS AND GYNAECOLOGY

Tuesday, July 18

Tuberculosis and Pregnancy

After the session had been opened by the president, Mr. A. A. GEMMELL (Liverpool), Mr. J. A. STALLWORTHY (Oxford) discussed genital tuberculosis. He said that during 1938 and 1939 in the investigation of cases of infertility he had been surprised to find tuberculosis being reported occasionally in endometrial specimens obtained by curettage. The patients were apparently well, and pelvic examination usually revealed nothing abnormal. He found that none of his senior colleagues

were familiar with this condition of silent endometrial tuberculosis. Shockaert and Ferin had in 1940 reported unsuspected tuberculous endometritis in 5% of women complaining of primary infertility. Mr. Stallworthy was certain that, owing to the ease with which the diagnosis could be missed both histologically and bacteriologically, the figure of 5% was too low. He pointed out that 3% of women at necropsy showed genital tuberculosis; and not all women complained of primary infertility.

Tuberculous endometritis was probably always associated with tuberculous salpingitis, and Sharman had made the interesting suggestion that subclinical tuberculous salpingitis was one of the common causes of infertility.

The clinical manifestations included infertility, menstrual disorders, pain, peritonitis, and fistulae. Amenorrhoea was a feature of the more advanced chronic cases with caseation rather than of the early cases. It was not clear why tuberculous endometritis and salpingitis were associated with infertility. Sharman had found tubal occlusion in 61.8% and Stallworthy in 50% of such cases. But this left 40% to 50% with patent tubes. Here he warned that no reconstructive operation for tubal occlusion should be undertaken until genital tuberculosis had been excluded bacteriologically. Pregnancy had never occurred in the presence of active endometrial infection. There might be a higher incidence of anovular menstruation in tuberculous cases.

Proof of infection depended on (1) previous clinical history, (2) histological evidence of giant-cell systems, and (3) bacteriological proof by culture or animal inoculation. The diagnosis could be confirmed only by bacteriological proof, and cure was established only when culture and animal inoculation were no longer positive. Regression of physical signs was an indication of improvement but no proof of cure. Failure to observe this standard had been responsible for many improved claims for the cure of this disease.

With regard to treatment, until recently the methods available had been sanatorium and heliotherapy, radiation, and surgery. Disciplined routine, fresh air, and good feeding needed emphasis. Sanatorium treatment had not resulted in cure in his experience unless calciferol, 100,000 units daily, was given. Radiation had the obvious disadvantage of castration when high dosage was used. Conservative surgery had been responsible for a high mortality and unnecessary fistula formation. Seventeen cases treated by Mr. Stallworthy by radical surgery (total hysterectomy and bilateral salpingo-oophorectomy) had resulted in 17 cures, no deaths, and no fistulae. But radical surgery was out of keeping with the subject under discussion—tuberculosis and pregnancy.

It was premature to make general claims for cure by streptomycin, but already by using only streptomycin, 1 g. daily for three weeks followed by a month of rest, then a further three weeks' treatment, five patients out of six had been apparently cured. In future he proposed to give streptomycin, 1 g. daily for three months, and "P.A.S.," 10–20 g. daily. Time alone would show whether the cures were permanent and whether pregnancy would follow. The use of antibiotics might restore conservative surgery to a safe and important place in the treatment of selected cases. The new method of treatment might cure pelvic tuberculosis and its complications, usually without the assistance of surgery, though sometimes with it; it might also enable pregnancy to occur in those who would otherwise have certainly been sterile.

In the discussion Dr. MARY K. LAWLOR (Shoreham-by-Sea) asked Mr. Stallworthy where he had treated the cases for three months and who had administered the streptomycin daily. Professor E. C. CRICHTON (Capetown) stressed the difficulty of diagnosis. He had had excellent results in the treatment of cases of tuberculosis of the vulva with streptomycin. Mr. CHARLES D. READ (London) asked whether Mr. Stallworthy had typed the organism, bovine or human. Mr. C. J. K. HAMILTON (Liverpool) wanted to know how long one should wait before operating after streptomycin treatment. Mr. W. G. MILLS (Birmingham) inquired about the follow-up study of cases of silent endometrial tuberculosis, and whether the ovaries might not be left when radical surgery was performed. Mr. IAN JACKSON (London) was interested in the salpingogram appearances in such cases. Mr. G. GORDON LENNON (Oxford) congratulated Mr. Stallworthy on his paper and said that he had treated three cases so far, and the general practitioner had given the streptomycin for the patients in their own homes. Others taking part in the discussion were: Mr. G. C. BRENTNALL (Southport), Miss ELIZABETH K. NICHOLSON (Morecambe), Miss PHILLIS DINGLE (Redhill), and Dr. J. V. DAVIES (London).

Mr. STALLWORTHY, in reply, stated that in many cases the patients were treated at home, if the conditions were suitable and the initial response satisfactory. The general practitioner or the district nurse gave the streptomycin. No typing had been carried out recently, but a previous small series had shown 30% of human-type bacilli. He thought this percentage over a larger series would be greater. There was a definite risk of acute flare-up with insufflation or hystero-salpingography, so he had little experience of salpingogram appearances. The optimum time for operation after streptomycin treatment was not yet decided. Speaking of follow-up, he said that he had employed radical surgery if masses had developed, and all had been cured. He always removed the ovaries, because it was impossible to tell macroscopically whether they were affected or not.

Phthisis and Pregnancy

Dr. R. C. COHEN (Braintree) opened the discussion by saying that pulmonary tuberculosis was the major cause of death in females between the ages of 15 and 39—a period which included the ages of greatest reproductivity. The effect of this disease on pregnancy was slight, and that of pregnancy on phthisis had long been in dispute.

No confirmation had been found for the belief that pregnancy, labour, and the puerperium had any harmful effect on the course of phthisis, though it had recently been suggested by Turner that the sudden fall of oestrogen level at parturition might be a possible factor. Changes in diaphragmatic level were of no practical importance, and treatments designed to counteract the alleged fall of the diaphragm after delivery were not rational.

Therapeutic abortion was difficult to justify on purely clinical grounds, but in occasional cases there might be justification on social grounds, such as the work and strain imposed by the care of the child, financial stress, and bad home conditions.

Antenatal supervision and avoidance of fatigue during labour were important. Suppression of lactation was indicated in the majority of cases. Treatment of the tuberculous lesion could proceed, with few exceptions, before and after labour as in the absence of pregnancy. It was particularly important for the phthisical pregnant woman to be brought under supervision as early as possible.

Experience with the administration of streptomycin to pregnant women had not so far revealed any harmful effect on the infant, in whom the blood level at birth was found to be approximately half that of the mother. The surest protection to the infant born of a tuberculous mother was to render the mother non-infectious. This could be done in a significant proportion of cases (36.4% at Black Notley).

Dr. R. GRENVILLE MATHERS (Harrow), in discussion, described the difficulty of getting these patients into hospital for treatment. He found great difficulty in maintaining pneumothorax in the last three months of pregnancy, and he considered social conditions important in determining the management of the case. Miss PHILLIS DINGLE (Redhill), who had published a paper in 1944 on the use of pneumoperitoneum in the puerperium, said that she had persisted in this treatment for ten years. She believed it to be a harmless procedure, easily induced, and necessary to combat the diaphragmatic shift after delivery. Her results were as good as those of Dr. Cohen and others.

Replying to questions, Dr. COHEN emphasized that there was little evidence that the tuberculous woman was made worse by pregnancy. Bad social conditions were often the only reason for termination. He did not agree that pneumoperitoneum was a safe procedure, since embolism and ascites (from which the tuberculosis organism could be recovered)

might and did occur. He was against it as a prophylactic measure. He found sterilization a most difficult problem, but again social conditions might be the most important factor. If it was the case that the woman could not be controlled adequately because of the poor facilities available for her care he would favour termination. There was no place for termination in the "pre-tuberculous" case.

SECTION OF PATHOLOGY AND BACTERIOLOGY

Tuesday, July 18

New Methods of Microscopy

With the president, Professor H. L. SHEEHAN, in the chair, a technical but stimulating review of recent advances made with the aid of new methods of microscopy was opened by Dr. R. BARER (Oxford). Dr. Barer, who discussed the reflecting microscope, made the point that the microscope was no longer to be regarded as a magnifying-glass. Although the unstained cell appeared transparent by ordinary transmitted light, it had been well established by staining techniques that besides the nucleus the cell contained various bodies such as mitochondria, nucleoli, and chromosomes, while cyto-chemical methods were revealing the nature of some of these bodies.

The work of Casperson from 1936 onwards had shown that, with different wavelengths of ultra-violet light, absorption spectra could be plotted and a knowledge gained in that way of the chemical constitution of the cell. However, quartz glass, which must be used with ultra-violet light, had certain optical drawbacks such as focusing and wavelength correction, and these difficulties had been overcome by the introduction of the reflecting microscope, developed by Dr. Burch, of Bristol. With this instrument objects could be focused at high magnification and at a long working range with light of any wavelength. But the reflecting mirrors were difficult to make, since they were not quite spherical, and modifications consisting of reflecting mirrors and refracting lenses of fused quartz and fluorite had been introduced. A particularly interesting development was the use with the reflecting microscope of a spectrographic eyepiece, so that a series of spectrograms taken in ultra-violet light or infra-red light could be prepared. The absorption bands could then be interpreted in terms of particular chemical groupings. Thus the uptake of antibiotics and carcinogenic substances by cells could be detected, while the arrangement of chemical groups in crystals could be studied with infinitesimally small amounts of material.

In reply to questions, Dr. Barer said that fresh cells and unstained smears were used but that living cells could not be used with infra-red light because of the non-specific absorption by water. Chemical fixatives, on the other hand, did not affect the light absorption by proteins in the cell. He agreed that the morphology of the cell must be known when interpreting absorption spectra.

Phase-contrast Microscopy

Dr. A. F. HUGHES (Cambridge) described the use of phase-contrast microscopy in tissue cultures, which allowed an intimate study of cellular dynamics. While phase-contrast microscopy had largely overcome the optical obstacle, it was not so certain that observations on living cells bred and examined under artificial conditions gave a true picture of cellular activity. However, the various phases of cell division in tissue culture could be observed in much greater detail than had been possible when Dr. Strangeways had made his first observations 30 years ago. Another advance was the cine-film, which had allowed a photographic record of cellular activities greatly speeded up. Dr. Hughes showed that in the so-called "resting cell" there was in fact considerable activity, particularly of the mitachondria in the cytoplasm, although the nucleus and its contents appeared inactive.

Before obvious signs of mitotic division, the nucleoli disappeared in a granular matrix and the chromosomes became active and attached themselves to the spindle during the prophase. Then the chromosomes drew apart to the poles of the spindle (metaphase), they coalesced, the cell divided, and a nuclear membrane formed around the chromatin mass. The nucleus enlarged, apparently because of water being imbibed by the chromosomes, the nucleoli re-formed, and the granularity gradually disappeared.

Mr. A. KING (London) discussed the use of ultra-violet light and phase-contrast microscopy in the study of the Rous sarcoma and its filterable agent. Ultra-violet light allowed resolution down to 0.1 micron, it was not affected by differences in refractive index, and it avoided trouble from artifacts. A suitable microscope, based on that devised by Dr. Barnard, was being used in conjunction with monochromatic light at 2,570 Å. The ultra-violet light had, however, a deleterious effect on the cell, as was shown by the disappearance after a time of the mitochondria. Small particles, 0.2–0.4 μ in size, were noted in strings and various patterns in the cell, while fine fibres were seen running across the surface of the cells. The concentration by centrifugation of virus particles could be demonstrated and changes in the aggregation of the particles noted, but it was difficult at present to estimate their size, which had been given by other workers at 0.06–0.075 μ.

Dr. A. S. MCFARLANE (London) illustrated with a fine series of photomicrographs some of the latest developments of the electron microscope which could give resolution of objects down to a few mμ in size provided the density was sufficiently high. Details of structure had been greatly facilitated by "shadow-casting," and by the use of the collodion replica, which made a mould of the object. However, the possibility of distortions from drying must be kept in mind. He showed that the tails of spermatozoa consisted of coiled-up fibrous spirals demonstrable after peptic digestion; that retinal rods were made up of a series of flat disks with raised rims piled on top of each other; and that the myofibrils of which the muscle fibre was composed were hollow tubes with anisotropic and other bands and with a network of beaded protein filaments running across the bands. He discussed the "polyhedral" disease of insects, which was now accepted as a virus infection although the virus itself constituted only about 3% of the polyhedral body. The rest of the material, somewhat akin to the capsular substance of bacteria, was antigenically identical with the virus but was quite inactive.

Replying to Professor A. W. DOWNIE (Liverpool), Dr. McFarlane said that there was no nucleic acid in the capsular material of the polyhedral body. In answer to Dr. J. CRAIGIE (London), Mr. King estimated that the effective dose of the Rous sarcoma agent was probably around 100–1,000 virus particles.

SECTION OF CHILD HEALTH

Tuesday, July 18

The General Care of the Physically Handicapped Child

From the chair, Professor NORMAN B. CAPON (Liverpool), president of the Section, extended a warm welcome to the many visitors present. In his opening paper Dr. C. D. S. AGASSIZ (Carshalton) submitted a plea that knowledge concerning diagnosis of physical handicap and the results of long-term treatment should be more widely known. He maintained that treatment was more effectively organized if children were grouped according to age and disease. The bed-ridden child found encouragement in the progress made by those whose treatment was more advanced. In contrast the physical handicap received under-emphasis when clinical conditions were mixed. Education was of primary importance, and instruction was better given in a class-room than in a ward. Beneficial contact with the outside world could be secured by establishing Scout groups and by installing television. An invalid or "cripple" outlook was to be discouraged. Discussing special causes of physical handicap Dr. Agassiz commented on the lack of uniformity in treatment of anterior poliomyelitis. He recommended that hot-pack treatment be started at once. The results of prolonged re-education were impressive. He was not in favour of precipitate recourse to appliances, and he urged that cases should be followed up systematically at aftercare

clinics. Tuberculous disease of bones and joints was unsuitable for treatment in a general hospital. Special hospitals should possess a splint workshop where appliances could be fitted under the eye of the orthopaedic surgeon. Referring to cerebral palsy, Dr. Agassiz, who illustrated his paper with lantern slides, showed that diagnosis and treatment in infancy were essential for the best result. If there were doubts about diagnosis an infant should be admitted for observation. Treatment consisted of education of the nervous mechanism. Rheumatism took prior place as a cause of physical handicap. Centres for supervision organized by the London County Council had proved of value in the prevention and early detection of relapse, and there was a case for extension of such schemes throughout the country.

Administrative Aspects

Dr. H. M. COHEN (Birmingham) discussed administrative aspects, and asked for greater recognition of the care already being given in this country to children suffering from cerebral palsy, and of the encouragement given by the British Council for the Welfare of Spastics. Nevertheless a need remained for expansion of schools (day and residential) for the physically handicapped. He was glad to note the growing readiness of local education authorities to combine to make provision on a regional basis. There was an additional need for special residential accommodation for children with spinal conditions and severe muscular dystrophies, who needed special help for ordinary personal activities. Separate special schools should be provided for children recovering from acute rheumatism, but these schools should not be used for children with severe chronic disability resulting from congenital heart disease or rheumatism. Dr. Cohen referred to the benefit derived by selected children sent to Switzerland as part of their treatment. He urged that patients should be encouraged to visit residential special schools; stressed the importance of the health visitor's work of ascertainment; and suggested that an aftercare officer should be attached to youth employment bureaux.

Dr. MARY D. SHERIDAN (London) discussed aspects of the handicap of deafness. The severely deaf child lived in isolation and was intellectually retarded through deprivation of the common experiences of life. He tended to be restless, insatiably curious, reckless, and uncontrollable. The partially deaf child was more fortunate but might too easily be considered intellectually subnormal or psychologically disturbed. He was late in learning speech if his disability was present before his third or fourth birthday. Defects of articulation varied according to the degree of deafness. Defective articulation persisting beyond the age of 6 or 7 years called for a complete investigation of hearing (including audiometry tests) by medical practitioners expert in the management of young and retarded children and in the use of the audiometer. High-tone deafness was the commonest source of diagnostic error. Home background had a great educational value, and attendance at day schools was to be encouraged.

Psychological Effects

Dr. ALAN MABERLY (London) stated that the psychological effects of a physical handicap might be the direct outcome of nervous damage or, more commonly, the indirect result of social inadequacy. Active disease, such as tuberculosis or rheumatism, reduced stamina, vitality, and competitive capacity. Restricted activity was the result, and frustration followed. According to temperament either defeatism eventuated or compensatory efforts were made in alternative channels of expression. The needs of the physically handicapped child were protection from stress and competition; training and re-education; encouragement; and an objective. Sympathy should not lead to spoiling. Handicaps of athletic or social significance (birthmarks, obesity, harelips, etc.) needed special attention. Physical defects were of great psychological significance throughout childhood, but especially so at adolescence.

In the course of subsequent discussion Professor CAPON mentioned the cost of making provision for handicapped children. The per capita cost was very high, and questions arose concerning expense to the community which were difficult to answer. Professor W. S. CRAIG (Leeds) drew attention to the need for greater co-operation with teachers, and referred to difficulties resulting from the long absence on holiday from hospital and special schools. Professor WILFRID GAISFORD (Manchester) suggested that visiting of relations could be extended to include siblings of school age. He submitted a plea for special provision for the child with acute rheumatism but a normal heart.

In his reply Dr. AGASSIZ said that the cost of treating cerebral palsy is fully offset by many benefits in other directions—economic and humanitarian. In his experience, if cerebral palsy was treated in infancy speech defect did not develop. Some economy was secured by enlisting the help of the mother.

SECTION OF OCCUPATIONAL HEALTH

Tuesday, July 18

Dangers of Insecticides

Dr. A. THELWALL JONES (Liverpool), who was in the chair, opened the proceedings by regretting the absence through illness of the president, Dr. DONALD HUNTER (London). Dr. P. LESLEY BIDSTRUP (London) said that the need to increase food production had led to the development of powerful insecticides in Germany during the 1939–45 war, when the organic phosphorus insecticides were described by Schrader. Substances of this type at present in use in this country and the U.S.A. included H.E.T.P. (hexa-ethyl-tetraphosphate), T.E.P.P. (tetra-ethyl-pyrophosphate), "parathion," and O.M.P.A. (octamethyl pyrophosphoramide). Parathion was more stable than the other compounds mentioned except O.M.P.A., the latest to be developed, and was thus more dangerous to human beings and insects. Its use had increased because of its prolonged insecticidal action. In the 1949 spraying season seven deaths and more than 100 cases of poisoning were recorded among persons exposed to parathion in the U.S.A. In Great Britain so far only four cases of poisoning had been recognized.

Persons afflicted had been agricultural workers, entomologists, aeroplane dusting pilots, and industrial workers, including chemists and packers. These compounds were toxic because they were powerful inhibitors of the enzyme cholinesterase. They were absorbed through the skin, by inhalation, by ingestion, or through the conjunctivae. Symptoms and signs caused by all of them were somewhat similar.

The first symptoms were anorexia and nausea. Symptoms due to parathion were more insidious in onset. Poisoning with H.E.T.P. and T.E.P.P. occurred less often because of rapid hydrolysis and early constriction of pupils, which forced a man to give up his work without delay. Signs and symptoms of parathion poisoning could be grouped as, first, those due to over-stimulation of the autonomic nervous system, and, secondly, those due to action on the central nervous system. For the first group atropine was the specific antidote in adequate doses; 1–2 mg. (1/60–1/30 gr.) should be given at the onset of symptoms and repeated hourly until the pupils were dilated and symptoms had subsided. Atropine did not protect adequately against the second group of symptoms or a third group of nicotinic effects such as muscular twitchings, weakness, and paralysis. Facilities for prolonged artificial respiration must therefore be available for immediate use. Early treatment with atropine was essential, as the combination between the cholinesterase and parathion was irreversible after a few hours. Restoration of serum and tissue cholinesterase could take place only by regeneration, which took several hours or months. Thus an individual who had been poisoned was unduly susceptible until cholinesterase had regenerated.

Preventive measures in factory and field must be directed against the risks of absorption through all routes. They were so elaborate that men using parathion must be adequately supervised. Pre-exposure and regular estimations of the cholinesterase activity during exposure were suggested. Persons who had been affected by any of the organic phosphorus

insecticides should not be further exposed until cholinesterase activity of serum and tissues had been shown to be normal. Since the interpretation of results of such estimations presented a number of difficulties, a more simple test was urgently required.

Dr. F. A. DENZ (Carshalton) explained the mode of action of parathion, T.E.P.P., and O.M.P.A. Acetylcholine was normally liberated at the parasympathetic nerve endings and stimulated glandular secretion and the movement of plain muscle. Acetylcholine was hydrolysed by cholinesterase, but destruction of this enzyme by these compounds resulted in the persistence of acetylcholine at parasympathetic nerve endings, with consequent flooding of saliva, shedding of tears, intestinal colic, and bronchial constriction. These were the so-called muscarine-like effects, which were relieved by atropine.

When the impulses passed from nerve to muscle at the myoneural junction a minute amount of acetylcholine was liberated and gave rise to an electrical impulse, but it was almost instantaneously broken down by cholinesterase. If this enzyme was inactivated there were repeated stimuli, and muscular weakness and fibrillations occurred. Death was usually due to paralysis of the respiratory muscles. As atropine was almost certainly of no help in combating these nicotinic effects, it must be regarded as an incomplete antidote.

The danger of these compounds depended on their stability. O.M.P.A., the most stable, circulated in the sap of the plant for weeks. It was the entomologist's perfect insecticide and the physician's nightmare.

These compounds had no cumulative action in the ordinary sense of the word, but repeated exposures could produce a low blood cholinesterase without causing any symptoms. In this state a minute dose might cause unexpected death. Animal experiments so far suggested that the problem of poisoning by these insecticides was one of acute toxicity only. There was no evidence of permanent damage from lung exposure.

Atropine as First Aid

Professor R. E. LANE (Manchester) suggested that, as atropine, in spite of its limitations, was such an important antidote, it might be put in the hands of an intelligent layman in charge of the process and administered as a first-aid measure. The difficulties in diagnosing a rare condition of this type were very great. Fifty years ago the Home Office faced the problem of anthrax by issuing the worker with a card describing and illustrating the signs and symptoms of anthrax infection. This could be presented to his doctor. A similar course could be adopted for those in contact with these insecticides.

Dr. M. W. GOLDBLATT (Welwyn) said that, while the simplest method of prevention was to restrict use to experts only and prohibit open sales, the virtues of these compounds were so great that their continued and increasing use was essential until less harmful materials were available. Protection of workers was difficult because the insect had to be attacked quickly at the appropriate stage in its development. Men exposed were therefore inclined to neglect protective measures. The Government, the medical profession, and employers all had responsibilities which they must meet, as the use of these dangerous substances would certainly increase. He emphasized that atropine must be given in adequate doses.

Dr. ALAN DAVID (Cambridge) said that many cases of parathion poisoning occurred because the written instructions for its use were ignored completely. Several cases were given small doses of atropine and showed no improvement, whereas rapid recovery often occurred with massive doses. Blood-cholinesterase estimations had shown that skin absorption was probably more insidious and dangerous than inhalation. Adequate training and education of workers, the provision of protective clothing, gas-proof caps, supplies of atropine in sealed containers to all persons exposed, good supervision in the field, routine medical examinations, including cholinesterase estimations, were essential if fatal accidents were to be prevented. In his organization every first-aid box contained a supply of letters for doctors describing the signs, symptoms, and treatment of parathion poisoning.

Dr. L. G. NORMAN (London) said that the danger of poisoning by organic phosphorus insecticides should be impressed on all medical practitioners, particularly in rural areas. He suggested that the B.M.A. be asked to recommend to the Ministry of Health that, at the appropriate time, all practitioners in this country be sent a circular letter describing briefly the aetiology, diagnosis, and treatment of poisoning by these compounds.

SECTION OF PREVENTIVE MEDICINE

Tuesday, July 18

Social Medicine

With the president, Professor W. M. FRAZER (Liverpool) in the chair, a discussion on the subject of social medicine was opened by Professor J. M. MACKINTOSH (London). Outlining the historical developments of social medicine, he stressed the need in undergraduate training of making the student feel the urge of social conscience and aim at practising medicine in the clear light of social diagnosis, prevention, and treatment. Social medicine had accomplished (1) the deliberate building up of the personal health services—for instance, scientific study of the causes and prevention of infant and maternal mortality and sickness, and the application of legislation to ensure health and efficiency—(2) the progressive study and understanding of childhood, especially of children between 2 and 5 years of age; (3) a medico-social campaign in relation to tuberculosis, a new and urgent priority based on statistical knowledge; (4) a campaign against venereal disease strengthened by increasing scientific knowledge; (5) attention, medical and social, increasingly given to long-term disability, such as that caused by poliomyelitis, rheumatism, and the ills of age.

There was much more to do. Professor Mackintosh deplored the tendency of overspecialization invading personal relationship between doctor and patient. There was a danger in thinking only of affected organs while remaining blind to the patient's medico-social needs. One after another, mother, infant, toddler, school-child, the tuberculous, diabetic, and rheumatic, and now the aged sick straggled in long procession to hospital. Soon the family doctor would not be allowed to mend a tear of the skin. Yet the family doctor still lived in a world of make-believe in which he was told that he was the backbone of medicine, health adviser to the family, and the front-line attack on disease. In the world of reality he handed out prescriptions, signed forms, sign-posted patients into hospital, and waged a long-drawn-out war of financial competition.

The remedies might be summarized as (1) greater emphasis on general practice and social factors in undergraduate teaching; (2) real contact with general practice *before* hospital work, as recommended by the Cohen Report; and also with local government health services; (3) government by the profession under Charter; and (4) abolition of the principle of payment per patient or per service and replacement by salary scales based mainly on length and efficiency of service and the area in which he practised. However controversial such remedies appeared, it was time for doctors to practise their art as teams, and not separately as rivals. It was time for them to practise social medicine *sociably*. Professor Mackintosh concluded by a quotation by Norman Macleod: "A man's charity to those who differ from him upon great and difficult questions is in the ratio of his own knowledge; the more knowledge, the more charity."

Disturbance of Ease

Dr. J. D. KERSHAW (Colchester) said that social medicine required a new concept. This might be obtained by thinking of "dis-ease" in the literal sense, "a disturbance of ease," and of the patient as a person whose mode of life and success in living were being threatened. Social factors might determine (1) the aetiology of the disease; (2) the development of the pathological process; (3) the patient's reaction, on which would depend the time when the "surrender point" was reached. The symptoms might appear in relation to the patient's way of living, and the physical signs might be masked or thrown into

relief by social factors. Treatment was a compromise between theoretical ideal and what was practicable in the patient's social circumstances, particularly where it involved a regimen—for example, diet, rest, change of climate. Prognosis was an estimate of the probable efficacy of treatment and subject to the same considerations as treatment.

For convenience of study social factors might be divided into the following eight groups or "complexes." Each interlinked with and affected the operation of the others. The first four operated directly, the last four operated usually through the first four. (1) Nutrition—the provision of the right amount of the right foods. (2) Housing, which shaped the life of the individual and the family, physically and psychologically. (3) Physical environment, including the effect of heat, cold, damp. (4) Stress and strain—work and its suitability to the particular individual, recreation, psychological conflicts and frustrations. (5) Civilization, which could be subdivided into (*a*) standardization of work, food, habits, and standards of living and even of thought; (*b*) urbanization—town life with all its concomitants; (*c*) sophistication—the artificial instead of the natural. (6) Economic—international, State, and household management. (7) Education—formal and informal training in techniques of living and in social and personal philosophy. (8) Social group, including the family, local community, State, and occupational and social class.

Social medicine was not only the practice of medicine in the light of social understanding, but the influencing of social life in the direction of human well-being. Not only were social factors to be considered in relation to disease, but their study was an essential preliminary to the provision of an optimum environment in which man could realize his full potentialities.

Dr. FREDERICK HALL (St. Annes-on-Sea) said that definitions of social medicine in general sought to establish a new concept of preventive medicine, allegedly differing in important aspects from that covered by the existing public health services. It was evident that as a result of the National Health Service Act there must be a revival and extension of the public health services. In the past, fear of infections had stimulated public conscience; to-day the high and increasing costs of treatment would provide a potent economic stimulant in the expansion of preventive medicine. Medical practitioners of the future must be better trained in a knowledge of the organized health services provided by local government, and of the deep-seated environmental and social influences which played so important a part in the physical and mental conditions which the family doctor was expected to treat.

In the discussion that followed, Surgeon Rear-Admiral Sir SHELDON DUDLEY (Leamington Spa) congratulated Professor Mackintosh on being courageous enough to say one could never hope for a really successful National Health Service until one kind of salaried service, not depending on the number of sick treated, was worked out. He was glad to find support for this opinion outside the Defence Services. He was pleased to hear that to get things done in local media one had to get the keen support of the administration. He instanced the 50-years lag between Lind's recommendations and their implementation by Blane, whose patron was the great and influential Admiral Rodney. In recent history, though they all knew how to prevent malaria, the apathy in consultant and senior officers at first led in one theatre of the war to a 76% malaria sick list. Stupendous efforts had at last persuaded the General Staff that malaria was a worse enemy than the Japanese. The prevention of tropical disease became the C.O.'s responsibility, and the incidence of malaria fell from 76% to 2%. The argument about what social medicine was continued, but that episode brought to mind the late Professor Major Greenwood's suggestion that social health was preventive medicine in which the administration and executive must co-operate with medical officers of health to get a successful result.

Dr. J. GREENWOOD WILSON (Cardiff) referred to the need for better team-work among all sections of the profession, and thought that in some instances the so-called rivalries and jealousies were due to sheer ignorance of what others were doing and what they stood for.

SECTION OF PSYCHIATRY

Tuesday, July 18

The Psychological Involvements of Child-bearing

In opening the meeting the president, Sir DAVID K. HENDERSON (Edinburgh), emphasized the importance of the subject. Present knowledge was largely confined to the psychosis, and little was yet known of the more subtle psychological changes which took place in the child-bearing woman.

Dr. EDWARD GLOVER (London) pointed out the close liaison which could exist between obstetrics and psychology. Normal child-bearing represented the successful overcoming of an unconscious conflict. On the one hand there were powerful urges arising directly from the sexual and reproductive instincts, which could be strong enough to secure reproduction in the face even of conscious repudiation of the wish for a child. On the other side were inhibitions derived from emotions of anxiety and guilt, and a passivity which overlay unconscious aggression. The sexual and reproductive instincts existed from birth, and the anxiety and guilt to which they gave rise persisted from puberty to the climacteric and after. Infantile sexuality contained primitive components; and during the psychic withdrawal that occurred in pregnancy regressional, oral, and excretory habits and fantasies appeared. From these were derived the apparently perverted forms of eating—e.g., of coal—to which some pregnant women were liable, the feeling that pregnancy was a state of being poisoned, the fantasy that the foetus was an impacted stool which must be got rid of. Man was constitutionally bisexual. Under stress the female was prone to regress from heterosexual and reproductive attitudes to infantile and sterile ones. From puberty onwards prodromal signs could be seen, and should be dealt with at the earliest moment. Diagnostic features might be found in psychoneurotic formations, psychosomatic states, disorders of sexual functions, marital difficulties, and character disorders. During pregnancy they might show in miscarriage, vomiting, delayed labour, etc. Types of person who unconsciously repudiated pregnancy because of unconscious homosexuality were prone to disorders throughout pregnancy. They were closely matched by the infantile narcissistic type who had unconsciously decided not to break the spell of being the perpetual child by becoming a mother. Dysmenorrhoea was significant, but the significance of frigidity varied according to the case. Marital difficulties were mostly end-products in themselves and mere precipitating factors in the disorders of pregnancy, which could be traced to the same factors as the prodromal signs: pregnancy was likely to awaken excretory infantile fantasies and to activate dormant hostilities—even to the point of depressive and paraphrenic episodes.

From the point of view of treatment, much could be done to reduce anxiety, superstition, and sometimes depression. The normal woman suffered from anxieties which could and should be allayed. However, true antenatal care should begin at the premarital stage. The aim of sexual education should be not only to free women from guilt and superstition but also to release more positive reactions. The unity of the mother–child relationship continued to the end of weaning, and it was only at this point that the psycho-obstetrician of the future will legitimately be able to withdraw. He had to ensure that the mother was protected against the more deplorable disciplines of separation from the child which characterized some institutional routines.

Emotional Changes

Professor W. I. C. MORRIS (Manchester) described the emotional stages which succeeded one another during pregnancy and childbirth: initial joy might pass through apprehension into exasperated resignation. Hyperemesis gravidarum was the one complication of pregnancy in which obstetricians had accepted the major importance of the psychological component. The primigravida looked forward to labour with fear—fear for herself, for the child, and for the impact of the child on her marriage. Much could be done to diminish this by education and suggestion. The influence of female friends and relatives was often malign; and the chatter of the antenatal

waiting-room had a sinister influence. If the fear was unrelieved effects on labour might be serious. The action of the uterus in the early stages was under the influence of the mind. As the first stage of labour neared completion the rapid recurrence of painful contractions gave the patient the feeling of an awful inevitability. The escape of fluid with rupture of the membranes might be associated with an emotional breakdown. At the onset of the second stage the distressed patient often recovered her morale surprisingly: there was a sense of progress. The third, or placental, stage was often critical. The exhilaration which immediately followed the birth of the baby might turn to disappointment. When the placenta had been delivered nearly all patients entered on a stage of extreme exaltation. The emotional rapport which the attendants achieved was never closer. This halcyon phase was soon clouded by the trials of the puerperium. Difficulty in emptying the bladder, the pain of a perineal wound, difficulties in establishing breast-feeding, all dimmed the patient's satisfaction. Thereafter a reasonable emotional balance was restored, though it might be in the face of difficulties—the most serious of which was a neonatal death. Some babies were troublesome and perverse. Until that passionate bore the proud father learned to sing his baby's praises his behaviour could be trying to his wife. Later on the economic disadvantages of parenthood began to appear. Whether to be confined in hospital or at home was a problem for the mother. On the physical side the advantages lay with the hospital, the balance of psychological advantages with home. It was important that the attendant should be one who could give continuous care, and the best compromise was that in which domiciliary care was vested jointly in family practitioner and midwife. Antenatal care was not necessarily best conducted by a consultant.

Puerperal Psychoses

Professor E. W. ANDERSON (Manchester) confined himself to the discussion of puerperal psychoses. It had often been maintained that the woman who reacted badly to childbirth was abnormal in personality or psychosexual constitution. This had never been proved. Zilboorg and others held that women who developed a puerperal psychosis had shown signs of aloofness, had unduly prolonged courtships, or had shown sexual frigidity. He himself had studied a group of 50 puerperal psychoses and 50 controls (non-puerperal psychosis in women of about the same age). This study was published in 1933. There were no material differences in the prepsychotic sexual life of the two groups. Frigidity was no commoner in the one than in the other. Study of the sexual life gave no indication of the likelihood of a psychosis. Masturbation and erotic behaviour was hardly commoner in the puerperal than in the other group, and was of no prognostic import. The attitude to husband and child was inconstant, and aversion from either was not frequent in the puerperal group. There was, in fact, no evidence of any abnormality of sexual constitution. The puerperium did not seem to differ in any way from other precipitating factors. Later work had confirmed these negative findings, and Zilboorg had since modified his views. Nevertheless the role of sexual factors in the psychotic disorders of childbirth had not been fully clarified, and much further work was necessary. It was not certain that there could not be a specific psychosis associated with childbirth. A recent paper by Kluge mentioned a state of clouding of consciousness, which was apparently not to be confused with the well-known toxic confusional states. The interest invariably aroused by this topic showed that psychiatrists had not rid themselves of the feeling, illusory though it might be, that the mental illnesses of the puerperium had peculiar features.

Effect of Cultural Factors

Dr. ELIZABETH TYLDEN (London) directed attention to cultural stresses and strains. Child-bearing was no longer the only possible goal of women: they were trained for other purposes, so that every pregnant woman faced a complete change in her way of life, from self-sufficiency to dependence, from companionship to loneliness. She was prepared for labour by the stories of suffering and mishap from other mothers. The physiological process of childbirth, like all others, was sensitive to emotional attitudes. In certain cases the response to labour could be modified and made pleasurable. Childbirth had analogues in menstruation and in the female orgasm. Some midwives were aware of the similarities and described labour in terms related to the pleasure of the orgasm. It was only lately that society had allowed women to have sex feelings: even now all but a minority were debarred by this cultural influence from achieving full vaginal orgasm. The difficulties which stood in the way had their counterpart in childbirth. Frigidity, vaginismus, and guilt over sex reappeared in an ambivalent attitude to the baby and in reluctance to aid the process of labour. The attitude of attendants—e.g., in the emphasis they gave to being "brave"—reinforced the suggestion. At the time of labour the patient was abnormally suggestible, and often ready to pour out her fears and anxieties. It was rarely that she was listened to sympathetically. The patient was regarded as a passive, ignorant child, to be scolded and punished. The sympathy, the attempt to increase the feeling of security, which were given to the stammerer and the child with a tic, were not given to her. Much could be done to reduce the psychological mishaps of labour by attention to these cultural factors.

In the discussion which followed, Dr. ALAN BARKER (Whitstable) said that the deeper psychological problems did not really arise from the general practitioner's point of view. He mentioned a case in which the hostility of the mother-in-law to her daughter's marriage and pregnancy had led to disaster. Cases of delayed labour in which there was no physical abnormality could have been helped by a discussion of the woman's problems during pregnancy. Midwives, and doctors too, should be trained to be kind and have an open ear. Dr. REUBEN LIPMAN (Liverpool) emphasized the importance of earlier experiences for the conduct of pregnancy. Distortions of sex attitudes were passed on from parent to child. A few explanatory talks were insufficient, and psychotherapy was necessary. Dr. T. A. H. MUNRO (London) remarked on our lack of knowledge. Students were inadequately trained in the psychological aspects of childbirth. Teaching in this subject was best conducted in the woman's home. The best teacher was a senior rather than junior specialist obstetrician or an experienced family practitioner. From the psychological standpoint the isolation of the patient in hospital was dangerous and made her more vulnerable to emotional upsets. Professor T. FERGUSON RODGER (Glasgow) said that only now were we trying to bridge the gap which, as a historical accident, had separated obstetrics from psychiatry. In other cultures, such as the Indian, this gap had never appeared. The great difference between labour in the primitive woman and in the woman of to-day must be due to cultural factors. They should be dealt with by public education rather than individually. A way round the malign influences of other patients in the antenatal clinic would be to hold group discussions under guidance.

Sir DAVID K. HENDERSON said that physical factors had been overemphasized. The psychological factors which arose in connexion with the unwanted child, repeated abortions, and the hatred of the mother for her newborn child had to be faced. He did not think that homosexuality played such a large part. In replying to the discussion, Dr. GLOVER said that individual psychotherapy was seldom necessary and much could be done by simple talks. Professor MORRIS said that the present rush for beds in hospital labour wards arose spontaneously from the public and was not welcomed. It was now very difficult to provide the student with adequate domiciliary experience on the district.

SECTION OF ANAESTHETICS

Tuesday, July 18

Anaesthesia for Abdominal Operations

With the president, Dr. KATHARINE LLOYD-WILLIAMS, in the chair, a paper on applied pharmacology in anaesthesia for abdominal operations was read by Dr. STUART C. CULLEN (Iowa City, U.S.A.). He described a method of anaesthesia which, though not suggested as being the best one, did

conform to physiological and pharmacological principles. The method could well be labelled "polypharmacy," consisting as it did of the administration of a number of drugs, each being included for its own special properties. The basic drug was nitrous oxide, already known for its lack of irritation of the respiratory tract, its non-inflammability, and its ready diffusibility.

The other drugs were adjunctive and supportive, to permit the use of nitrous oxide in non-hypoxic concentration, to provide muscular relaxation, and to enhance analgesia. Reflex irritability and metabolic activity had first to be reduced by the judicious use of depressive drugs. These might be the barbiturates, morphine or pethidine, scopolamine, or "avertin." Dr. Cullen had investigated pethidine, but found that it produced little psychic effect when given as premedication. He preferred to use morphine and scopolamine for this purpose, with occasionally "nembutal" in addition. Thiopentone was used for rapid induction, followed by nitrous oxide given by the semi-closed carbon-dioxide-absorption method. Pethidine was then given in divided doses intravenously. Most patients were intubated, and all received curare. If respiratory depression or apnoea occurred, controlled respiration might be necessary. Dr. Cullen stressed the need for care during the post-operative period when relatively large amounts of depressant drugs had been given. His clinical experience was that nitrous oxide used in the above manner for abdominal operations provided satisfactory working conditions for the surgeon with little interference with physiological mechanisms.

The discussion was opened by Dr. WILLIAM W. MUSHIN (Cardiff), who said that since seeing the technique in the U.S.A. he had been investigating it during the past year. He confirmed that the use of pethidine in divided doses, intravenously, as a supplement to nitrous oxide, gave excellent results; there were rapid recovery, freedom from sickness, good residual analgesia, flexibility, excellent operating conditions, and absence of explosion risk. He hoped the method would receive wide attention and trial, since in his hands it had proved to be one of the best techniques yet devised.

Dr. T. CECIL GRAY (Liverpool) said he used a mixture of equal parts of nitrous oxide and oxygen, and felt that ether in small doses was also an effective analgesic. There was less depression of the cough reflex, and the patient wakened on the table. Dr. R. F. WOOLMER (Bristol) asked what benefit accrued from the use of concentrations of oxygen higher than 20%. Dr. G. JACKSON REES (Liverpool) said that the concentration of nitrous oxide breathed by the patient depended on the total volume of gases and on the amount of spill-over.

Dr. CULLEN in his reply regretted that the method had the disadvantage of being unsuitable for teaching. He cautioned against the use of low flows of gases.

Resuscitation of the Newborn

Two short papers on resuscitation of the newborn were read by Dr. G. ORGANE (London) and Dr. R. J. MINNITT (Liverpool). Dr. Organe said that breathing movements started, with the respiratory tract full of liquor, long before birth. The intra-uterine tidal exchange was small and the alveoli were only partly expanded. The baby was squeezed through the birth canal and was "wrung fairly dry." The fundamental cause of failure to breathe at birth was depression of the respiratory centre, anoxia being a cause of this. The tolerance of the foetus to anoxia decreased with maturity. The postmature were more likely to die of asphyxia during delivery, the premature more likely to fail to breathe adequately after delivery. Most anaesthetics and analgesics would produce foetal apnoea, with the exception of cyclopropane, where foetal respiration continued in the presence of full maternal anaesthesia.

The asphyxiated baby was treated by placing it head down and wrapping it up. The pharynx was cleared. Rubbing the back was a good stimulus to breathing. He did not use stimulants. Oxygen was given by gentle inflation through a face mask. A tracheal tube was kept ready for use on rare occasions. The premature baby was put in an oxygen tent. Transfusion or circulatory stimulants were never used.

Dr. Minnitt based his paper on figures of some 2,500 labours conducted in the Liverpool Maternity Hospital during 1949. From these he was able to draw the following conclusions: (1) No resuscitation had been necessary for any baby when only gas-and-air analgesia had been used during labour (over 300 cases). (2) When a number of analgesic drugs had been used during normal labour the percentage of babies requiring resuscitation had been high (2.8%). (3) For caesarean section rapidity of delivery after induction of anaesthesia diminished the likelihood of the necessity for resuscitation of the infant. (4) Lobeline and oxygen administration appeared to be the commonest method of treatment for resuscitation.

In the discussion Dr. W. N. LEAK (Winsford) disagreed with the opening speaker. He thought that stimulants were of the greatest value in starting respiration. He used "cardiazol" and ephedrine intramuscularly. He had seen no mental deterioration even after prolonged asphyxia. Dr. E. H. WINTERBOTTOM (Liverpool) squeezed the tendo Achillis as a stimulant. Dr. J. W. DUNDEE (Liverpool) said he used carbon dioxide. Making the mother hyperventilate during an anaesthetic might cause apnoea of the baby. Dr. G. CATHERINE EVANS (Herne Bay) paid tribute to the value of the Minnitt apparatus. She now added "trilene" to the mixture. Dr. J. R. GREGORY (Kenya) thought that the needle prick was the important part of any injection. He strongly advocated chloroform. His infant mortality had risen with the use of trilene. Dr. R. P. HARBORD (Leeds) asked when intubation should be performed, and whether there was any danger in using an absorber after the woman had been breathing trilene. Dr. A. R. HUNTER (Manchester) confirmed Dr. Minnitt's results that pethidine increased the risk of asphyxia. Dr. JOHN BULLOUGH (Southport) reported that in performing laryngoscopy he had seen the cords in spasm with a pool of amniotic fluid against them. Dr. B. G. B. LUCAS (London) pointed out that in the foetal lung the alveoli were closed. The lungs could not be inflated, and some nervous mechanism might come into play at birth, causing the bronchioles and alveoli to open up. Drs. L. RENDELL-BAKER (Cardiff) and SHILA G. RANSOM (London) also took part in the discussion.

In reply Dr. MINNITT stressed the value of mouth-to-mouth inflation of the baby's lungs, and Dr. ORGANE reported a case of fifth-nerve palsy following the use of an absorber on a woman who had had trilene analgesia for eight hours.

SECTION OF OPHTHALMOLOGY

Tuesday, July 18

Radiation, Light, and Illumination

The president, Mr. A. McKIE REID, introduced Dr. J. N. ALDINGTON, of Preston, director of large research laboratories from which had come many important contributions on illumination problems. Dr. Aldington gave a demonstration on radiation, light, and illumination. He said that the eye had evolved through many ages under continuous radiation from the sun, yet it had been subject to only part of the spectrum. Every part of the human body was designed by evolutionary processes to function in a particular way, and if it was subjected to some other conditions certain damage, either long-term or short-term, might be expected. Such subjection in the case of the eye was, in fact, now being done, but sufficient experience had been gained to make it clear that there was no evidence of damage.

Up to about 1930 the light sources in common use gave continuous radiation from the ultra-violet to the infra-red, whereas now the sodium lamp in use for street lighting in Liverpool gave virtually monochromatic illumination, yet no damage to the eye was apparent. Only during the last few decades had the work done in improving artificial light been carried out with any rapidity. Historically the earliest of all means of producing light was the oil-wick lamp, and this lamp used by prehistoric man was very little different from its modern equivalent. With the advent of electricity it was found that the passage of an electric current through a resistance—a piece of wire—would raise the wire to incandescence, and that, in

addition to heat, light was produced. It was not realized at first—what now seemed obvious—that the way to get more light was to make the incandescent body hotter. At a relatively low temperature the main energy was in the infra-red region, unappreciated by the eye, but with higher temperatures the peak of radiant energy intersected the visible spectrum. For practical purposes, the greater the heat the more efficient the production of light.

When incandescent lamps were first produced the filament source was carbon, and the light given was 1.4 lumens per watt. When the filament was coated with a more coherent layer of carbon the efficiency went up to 4 lumens. The first tungsten lamp operated at 10 lumens. The gas-filled lamp operated at about 15 lumens, and with the shifting of the peak towards the ultra-violet some 25 lumens per watt might be given. With increase in temperature, of course, went a decrease in the life of the lamp. One of the rare gases—generally argon—was used to enable the filament to operate at a somewhat higher with Dr. P. H. O'DONOVAN, a vice-president, in the chair, Produced light primarily by the electrical excitation of gas or vapour contained within a transparent envelope—had been in use for illumination purposes for only about twenty years. In the experiments with different elements sodium and mercury proved to be the best. Of all the elements sodium gave its resonance illumination best in the visible spectrum. It was the most efficient source commercially available, and as visibility on the road was important it was thought wise to use this illuminant for street lighting, giving as it did excellent visibility with maximum economy, even though the visual effect was to many people unpleasing.

Dr. Aldington also demonstrated some recent xenon-filled gas tubes for the photography of the eye. It had been found that if the rare gases were excited to a certain heat very high efficiencies could be produced. He exhibited a flash bulb which was operated by a small microphone. It was necessary only to clap the hands in the neighbourhood of the microphone to cause a flash of the bulb, which was particularly useful for the photography of the eye because the flash was over before the reflex mechanism of the eye could start, and therefore the exact condition of the eye was recorded.

Colour Vision in the Central Fovea

Dr. E. N. WILLMER (Cambridge) read a paper on colour vision in the central fovea. He said that he desired to relate the work which he, with others, had been doing on the central fovea with some of the more orthodox and standard views about colour vision. It was certainly clear from an examination of the various tests for the perception of colour blindness that knowledge of colour vision was defective. No test for colour blindness was perfect; each test detected some defects but let others through. The theory of colour vision which still held the field was the trichromatic theory, which was put forward 30 or 40 years ago. It was supposed that colour vision depended upon the existence of three types of cones, respectively blue-, green-, and red-sensitive—and the impression was that each of these types responded to its particular light. In point of fact, however, each of these elements was quite certainly responsive to a different part of the spectrum, and probably when only one type of cone was stimulated the sensation was colourless. It had been held that the rods did not contribute to colour vision, but was this certainly proved? He thought there was no escape from the interpretation that the rods were contributing to the sensation of colour. If there were only one receptor such receptor could not distinguish colour in the sense of hue and brightness; it could give only a response in relation to its total sensitivity on the wavelength of the light which was being used. With two receptors vision would be dichromatic, but to see all the colours involved some third mechanism.

The central fovea contained nothing but cones, and it might be supposed that this was the best point in the eye for colour vision, but in fact it was not. It was unlikely that the failure of the fovea was due either to failure of the receptors or to the number of ganglion cells; it seemed likely that some factor present in the rest of the eye was not present in the central fovea. Dr. Willmer then discussed various types of colour blindness—monochromatism and dichromatism classified into certain subgroups. Taking the whole fovea, the normal person had a red, a green, and a blue mechanism. The protanope had two receptors, and the deuteranope also had two, but a combination of pathways occurred. Dr. Willmer concluded by showing diagrams illustrating the probable pattern of adaptation. He said that the solution to many questions still awaited further analysis and that the problem of colour vision was not yet determined.

Time did not allow of discussion of either communication, but the thanks of the Section were expressed to the speaker by Mr. J. R. WHEELER (Belfast) and Dr. D. L. CHARTERS (Birkenhead).

SECTIONS OF MEDICINE AND SURGERY

Wednesday, July 19

Ulcerative Colitis

At a joint meeting of the Sections of Medicine and Surgery, with Dr. P. H. O'DONOVAN, a vice-president, in the chair, Professor T. L. HARDY (Birmingham) opened the discussion on ulcerative colitis. He said that ulcerative colitis might be defined as a severe idiopathic disorder of the colon, in whole or in part characterized clinically by diarrhoea and by rectal discharges of blood, mucus, and pus. It was accompanied by constitutional disturbances such as fever, secondary anaemia, loss of weight, and dehydration in varying degree. To these must be added a prolonged course with marked tendency to relapse, an unsatisfactory response to treatment, and a high mortality rate.

The aetiology of the disease was obscure. There was good reason to believe that it was not primarily an infective disease, specific or non-specific, and that the part played by the micro-organisms, though important, was by way of secondary invasion. Emotional disturbances could precipitate the disease and cause relapse in many cases.

Much had been heard lately of the mucolytic enzyme lysozyme, a ferment discovered and described by Fleming in 1922. It could digest the mucous envelope of bacteria, altering in some ways its protective properties. There was a high lysozyme content of the stools in ulcerative colitis, and a tendency for it to disappear as the stools became formed, but it was probable that the quantity was dependent on the amount of pus present.

The death rate was probably between 25% and 50%. The sex incidence was about equal, and the disease was mainly one of young adults. It was rare after the age of 40 and very rare in young children. Inheritance played no part. The onset was usually gradual. The first symptom was commonly a simple watery diarrhoea; blood, mucus, and pus appeared later. Occasionally there was frank haemorrhage. Pain, as an early symptom, was usual.

The diagnosis was rarely in doubt when the patient came to be admitted to hospital. The age, the history of remission and relapse, the flat and slightly tender abdomen, typical stools, and the occurrence of anaemia and dehydration made up a characteristic picture. An irregular fever might be present. Confirmation could be readily obtained by proctoscopy; sigmoidoscopy and barium studies were best avoided in the acute stage.

The basis of treatment was prolonged rest, and ample high-calorie, high-protein, high-vitamin, and low-residue diet, abundant fluids, the use of iron, and blood transfusion. Streptomycin had been disappointing, the organisms in the faeces rapidly becoming highly resistant and the clinical results being negligible. Six cases had been treated with chloramphenicol and four cases with aureomycin. The results suggested that in the newer agents better methods of controlling secondary invasion, and thus of making surgery safer, had been discovered. Cortisone and adrenocorticotrophic hormone caused a remission of symptoms, but did not eradicate the disease.

There was only one way in which the diseased colon could be put at rest, and that was by interrupting the faecal stream at a point proximal to the ileo-colic sphincter by an ileostomy. It was a mutilating operation, but the improvement in health

when the colon was put completely at rest was so greatly superior to anything seen by medical treatment alone that it should be advised more and more in selected cases.

Since 1946, 63 cases of severe ulcerative colitis had been seen. Twenty-three had received ileostomies, with one death due to rapid salt depletion. Ten had undergone colectomy, with one death, and 18 were working full time; three were convalescing from their treatment. Of 30 cases treated medically 17 were following their full-time employment. Ten were incapacitated by their disease, and three had died.

Mr. A. HEDLEY WHYTE (Newcastle-upon-Tyne) emphasized that little was known about the condition. The disease manifested itself chiefly by a blood-stained mucopurulent diarrhoea. The onset might be dramatically sudden or insidious, and the course was usually progressive, although there might be remissions and often a tendency to a spontaneous cure. In some cases the rectum and distal colon only were affected, though the whole colon and often the lower ileum might be involved. Bargen, of the Mayo Clinic, had tried to establish a diplostreptococcus as the cause of the condition, but it probably played only a secondary part. General states of chronic ill-health, upper respiratory infection, and emotional upsets might play a causal part, but it was significant how often the bowel supplied by the sacro-pelvic nerve is involved.

Statistics at the Royal Victoria Infirmary, Newcastle-upon-Tyne, showed that one-third of the cases occurred between the ages of 30 and 40; one-sixth between 20 and 30; and one-sixth between 40 and 50. Very few were under 20, and from 50 onwards the age incidence slowly diminished. The disease was more often found in the female than in the male, in the ratio of approximately 2 to 1.

The progress of the disease was unpredictable. Many cases were mild, and the patients little affected, though there was an acute fulminating variety difficult sometimes to diagnose and treat, and sometimes recognized only at necropsy.

Diagnosis was made from the history, general appearance of the patient, and proctoscopy. In a considerable number of cases no *x*-ray changes were demonstrable by barium-enema examination, though there might be a characteristic loss of normal haustration, and the outline of the bowel might be described as feathery or even like a pipe stem.

Medical treatment sufficed to make many patients comfortable, but frequent exacerbations, excessive loss of blood, and complications such as abscess, fistulae, arthritis, pseudopolyposis, stricture formation, and malignancy required surgery. Experience with the use of a Miller–Abbott tube passed down so as to be immediately proximal to the diseased bowel raised the possibility of avoiding an ileostomy. The most satisfactory operation was terminal ileostomy. Ileostomy should never be practised as an emergency procedure, since it carried with it a high mortality. It was the most effective way of resting the diseased colon and should often be followed by colectomy. It had often been suggested that vagotomy diminished excessive intestinal movement, and, together with the administration of sulphonated fatty alcohols to inactivate pancreatic enzymes and excessive lysozyme, might be an effective method of treatment in early cases. The incidence of malignancy was variously estimated, but when present it was a most distressing complication, often occurring in young persons and pursuing a rapid course. It was a further indication for colectomy.

Psychological Factors

Dr. J. W. PAULLEY (Ipswich) recounted his experiences in a study of psychological factors between 1946 and 1949. He had found a higher family incidence among close relatives of colitis patients than among controls. The patient showed a marked mother-dependence. Emotional relationships in the family often precipitated the disease. Birth, death, marriage, and sickness, or departure of the person on whom the patient was dependent, were important.

The patients were excessively sensitive, and brooded over real and imagined wrongs and insults not for hours or days, as might be normal, but for weeks or months. Rows upset them greatly, and they would go to any length to avoid them, often with a martyred air. They were never outwardly aggressive, but tended to bear smouldering resentment.

Generally the males tended to be effeminate, and fastidiousness and neatness were common to both sexes. They were extremely serious and had a poorly developed sense of humour, self-righteousness, false modesty, and smugness. They were frequently described as having been model children, and might be excessively fearful. He found several patients who had successfully served as combatants in the war, only to break down when faced with a domestic upheaval. They were emotionally immature and childish, and of the many causes of this state the predominant one in colitis appeared to be maternal possessiveness. In this respect, perhaps, nowhere was the position of the mother more strong than in Jewish families, and the incidence of ulcerative colitis in this race was twice the anticipated rate.

If time was spent with the patient and the clinician accepted temporarily the transfer of the patient's dependence on his mother, he would provide a less possessive, less stifling source of security and could encourage the patient to grow up emotionally. By such methods he found it possible to achieve long remissions of the disease and to avoid the necessity for surgery in many cases.

Mr. HAROLD C. EDWARDS (London) found himself in agreement with the previous speakers, and thought that vagotomy was not sound in principle, and the results did not justify the continuance of this form of treatment. Ileostomy was the method of election, and if done early the bowel might recover and the ileostomy be closed. He pointed out, however, that the ileo-caecal valve was not a barrier to the disease, and the operation could not succeed if the opening had to be made through an inflamed ileum. Once there was extensive damage to the colon it was doubtful whether ileostomy alone would cure the condition, and colectomy thus became a necessity. The operative mortality for this operation was less than that of ileostomy. It should not be done in one stage, as there was grave risk of acute intestinal obstruction developing. Three stages were necessary, care being taken to see that there was reperitonization after each stage. He suggested that perhaps appendicostomy with repeated irrigations with the newer antibiotics might achieve success.

Mr. A. DICKSON WRIGHT (London) said that he had had five cases in which the proximal segment of the colon alone had been involved. Where segmental colitis occurred it never spread to the other part of the colon, so that it was possible in such cases to do a one-stage resection, joining the ileum to the distal part of the colon. Mr. P. G. MCEVEDY (Manchester) thought that ileostomy was sometimes a life-saving measure in acute fulminating disease, but in the chronic variety it was necessary to do a colectomy in stages. Mr. R. B. WELBOURN (Liverpool) recorded a case in which peptic ulcer and fibrosis of the liver had occurred in association with ulcerative colitis.

In reply, Professor HARDY stated that he shared the concern at the possibility of malignancy developing in this disease, though in his experience it had occurred in only three patients out of 350.

SECTION OF OBSTETRICS AND GYNAECOLOGY

Wednesday, July 19

Prevention of Prolapse

With the president, Mr. A. A. GEMMELL, in the chair, Professor R. A. LENNIE (Glasgow) opened the discussion with a paper on the prophylactic use of forceps. He pointed out that any woman who developed retroversion or prolapse and its concomitant features suffered from some inherent weakness of her supporting ligaments due to congenital causes. He had inquired into the incidence of forceps applications in a series of women who ultimately had undergone a vaginal repair, and the information obtained was interesting. In 300 consecutive cases, 140 had had forceps deliveries at the first or subsequent births, 152 had never had a forceps delivery, and 8 were nulliparous women. Thus approximately 47% had forceps delivery, 51% had spontaneous births, and 2% were nulliparous. It was rather difficult, therefore, to decide the exact part played by forceps in the prevention of prolapse. In a normal pelvis, with an average-sized head presenting in an occipito-anterior position,

the prevention of future prolapse did not depend on whether or not low forceps were applied, provided the head was not allowed to distend the perineum over an indefinite period. The position was entirely different when the head was still in mid-cavity and the membranes ruptured. Even when fully dilated the cervix was like a cuff around the child's head, and with every labour pain there was a downward thrust on the cervix and consequently a downward drag on the paracervical ligaments. Accordingly, when the head was unduly delayed in mid-cavity, as in a semi-rotated occipito-posterior position or in cases of deep transverse arrest due to pelvic contraction, the strain on the paracervical ligaments must be very great, and the application of forceps was indicated when the cervix was sufficiently dilated. If the cervix was not quite fully dilated it might even be justifiable to complete the dilatation manually before applying forceps.

The fact that 53% of the women in the series who developed prolapse had never had a forceps delivery suggested that prolonged strain on the paracervical ligaments culminating with spontaneous delivery probably did more damage than rapid forceps extraction. In occipito-posterior positions every effort should be made to manually rotate the head, and the anterior shoulder should also be rotated forward. Professor Lennie condemned rotation of the head with forceps whether Kielland's or ordinary axis-traction forceps were used. Kielland's forceps should never be used by the novice. He maintained that forceps should always be available for delivery of the after-coming head when the breech presented in a primigravida.

Opening the discussion, Mr. G. GORDON LENNON (Oxford) condemned the application of forceps in the occipito-frontal diameter as recommended in some cases by Professor Lennie. No novice should be treating the occipito-posterior position of the head, let alone using Kielland's forceps. But he believed that rotation by Kielland's forceps and extraction with a biparietal grip more closely imitated Nature's mechanism of rotation with descent than any other method. Miss PHILLIS DINGLE (Redhill) considered that the engagement of the head in the primigravid woman during the last three weeks of pregnancy was a factor in causing prolapse. Mr. W. G. MILLS (Birmingham) thought the judicious use of episiotomy was one of the most important factors in preventing prolapse, while forcible expression of the placenta often caused strain on the supporting ligaments of the uterus. Professor E. C. CRICHTON (Capetown) stated that the incidence of prolapse in Bantu natives was under 1%. He condemned delivery before full dilatation of the cervix. Mr. C. MCINTOSH MARSHALL (Liverpool) considered that a biparietal application of the forceps was most important whichever type of forceps were used. Mr. CHARLES D. READ (London) said that one of the striking features noticed during a visit to America had been the paucity of material for demonstrating repair operations, and he wondered if this was a result of a 90% forceps-delivery rate in primiparae.

Professor LENNIE, in reply, said that in his department in Glasgow fully 70% of cases were abnormal. If caesarean section was done for most of these cases the rate would be colossal. His aim was a live child and an uninjured mother, and he felt he obtained this by vaginal methods. He disliked the lack of control with Kielland's forceps. He did not object to an occipito-frontal application of the forceps provided there was reapplication after rotation of the occiput to the pubis. He found manual dilatation of the cervix satisfactory in some cases of prolonged labour, but it should never be done by the inexperienced.

Episiotomy

Mr. J. D. S. FLEW (London) referred to his paper on episiotomy which was published in the *Journal* in 1944. He said that episiotomy was done (1) to prevent tearing of the perineum, and (2) to facilitate various obstetric manipulations on the foetus. He believed there was often too much effort directed to saving the perineum until it was of tissue-paper thickness, and thus damage occurred elsewhere to mother and child. Hence there was a third reason for episiotomy: to prevent maternal and foetal damage. Under this heading was the question of subsequent prolapse. It was better to damage an area which could be seen and repaired at once rather than damage something which could not be seen and therefore could not immediately be rectified.

Mr. CHARLES D. READ (London) thought it was bad teaching to preserve intact the perineum at all costs. Routine episiotomy was performed in 100% of primigravidae in America, and might be another factor in the prevention of prolapse. He had found severe stress incontinence associated with occipito-posterior positions delivered as such. Professor A. M. CLAYE (Leeds) said he was sure the Bantu native did not have routine episiotomy, and he inquired when was the exact moment to do episiotomy. Mr. ROBERT NEWTON (Manchester) thought natural tears were better, since he had noted pain often followed repair of the episiotomy but did not occur after repair of natural tearing. Dr. J. SNYDER (Hahnemann Hospital, Philadelphia) supported the prophylactic use of forceps and episiotomy. He found the clean cut was best if repaired properly and did not result in pain later. He had taken over from an obstetrician who "ironed out" the perineum, and he had been kept busy doing repair operations on the cases where this had been done.

Mr. FLEW, replying, said that there were many factors concerned in selecting the right time for episiotomy—for example, maternal or foetal distress, vertex or breech presentation, the time when the perineum was about to tear, etc. He believed it should be done before the perineum was about to tear, and when the breech was about to be born, but there was danger in doing it too early.

Delivery after Repairs

Mr. BRYAN WILLIAMS (Middlesbrough) stressed that no one person was able to collect much data for statistical information on this subject. He reviewed the literature and pointed out that there was considerable variation in the incidence of recurrence of prolapse after delivery in cases in which a repair operation had been carried out. It was reasonable to assume that by repair the Manchester operation was meant. He believed that the incidence of cervical dystocia was high in the cases which did reach term, and that the bad results reported had been due probably to an excessively high amputation of the cervix. He submitted that amputation in patients of the child-bearing age was a dangerous operation and should not be carried out unless accompanied by sterilization. Institutional facilities and expert care must be available for any delivery after a repair operation.

Mr. CHARLES D. READ (London) said that the method of delivery depended on age and adequacy of the original repair and that a second repair was never so good as the first. He wondered whether there was a case for induction of labour, and emphasized the importance of the history of the previous labour. He pointed out that Hunter devised his cuff-operation for the young woman. He had seen two cases of late lymphoedema of the cervix due to lateral parametrial fixation. Professor R. A. LENNIE (Glasgow) endorsed Hunter's operation; he denuded the cervix as far as the external os and repaired any laceration at the same time.

Value of Antenatal Exercises

Mr. ROBERT NEWTON (Manchester) indicated that the value of antenatal exercises was not easy to assess. The exercises used during the past nine years in the Royal Infirmary, Manchester, included breathing exercises, tuition in relaxation, squatting, polishing the floor on hands and knees, contraction and relaxation of the pelvic floor muscles, pelvis-rocking, and posture-correction. He had reviewed two groups of cases, one a series of 100 mothers (of whom 83 were primiparae and 17 had had a second child) who had had these exercises, and the other a group of 90 who had not done exercises. He concluded reluctantly that exercises and relaxation did little to prevent prolapse or to lessen to any great extent the factors which bring about prolapse, but that they played a real part in producing a disciplined labour much more pleasant to the mother, accoucheur, and, perhaps, to the baby than it would otherwise be.

Mr. CHARLES D. READ (London) said that exercises build up muscles, and it was difficult to believe that they did no good. Miss MARY K. LAWLOR (Shoreham-by-Sea) said she had seen

very few cases of prolapse in the Gold Coast. The natives learned to walk well and developed considerable lordosis. When they sat they did so on their haunches. Mr. W. G. MILLS (Birmingham) endorsed the importance of posture; he believed that in the English woman the inclination of the pelvic brim was less tilted than in the native, and hence the former required corsets for support. Mr. IAN M. JACKSON (London) thought the important points were ability to relax, early episiotomy, and cutting short the second stage of labour. Mr. C. J. K. HAMILTON (Liverpool) also considered that posture was important. Mr. J. D. S. FLEW (London) stressed how important it was that the obstetrician himself should supervise the exercise classes. He believed pelvic-rocking was bad, since it led to sacro-iliac strain. Dr. MARGARET M. FISHER (Luanshya, Northern Rhodesia) said there was no prolapse in native women despite the fact that the relatives encouraged bearing-down long before the cervix was fully dilated.

Certain Common Problems

(*a*) *Postmaturity.*—At the afternoon session Mr. C. J. K. HAMILTON (Liverpool) said he had no doubt that there were true cases of postmaturity. Until the causes of the onset of labour had been solved the cause of postmaturity could not be known. In his series there were no cases of breech presentation. Taussig had rarely seen postmaturity in a breech presentation.

Analysing the criteria for a diagnosis of postmaturity, Mr. Hamilton said every observer had noted many cases where the last menstrual period was a false record of the duration of pregnancy, and it was essential to know the normal menstrual rhythm of the individual patient concerned. Nevertheless, in patients with more than 40 weeks' amenorrhoea and some additional evidence, postmaturity must be considered a possibility. Quickening was so variable as to be of no value in estimating maturity. The size, hardness, and mobility of the skull bones were points of value when used in conjunction with other evidence. Foetal measurement and estimation of foetal weight might suggest a baby larger than normal. Of the last 72 babies of 10 lb. or over born in Liverpool Maternity Hospital only 21, or 29%, were delivered 290 days or more after the first day of the last menstrual period. Foetal cephalometry and radiological evidence of centres of ossification were variable estimations.

Wrigley had suggested three signs of postmaturity: (1) the child larger than 7 lb.; (2) the child more rigid, due to an increase in muscle tone; (3) the less liquor the later the pregnancy. He had also stressed the value of the same observer watching the patient at frequent intervals during the later weeks.

The size of the uterus, noted carefully from early pregnancy, might be of great assistance. The condition of the cervix was important, whether taken up and dilated or completely closed.

If postmaturity was admitted, the problem of management was real. Mr. Hamilton believed that Barcroft's experiments on animals provided the physiological grounds for disquiet when a state of postmaturity had been reached. The foetus approached a stage of crisis, the alternative between death and escape.

During 1949 in the Liverpool Maternity Hospital there were 170 pregnancies which had a duration of 291 days and over; and 171 children were born. These cases were divided into confirmed cases where a vaginal examination had been done in early pregnancy, and unconfirmed cases which included emergency and booked cases where the dates were the only evidence of postmaturity. In the first group there were 100 cases with 101 infants and a foetal mortality of 7.9%. In the second group there were 70 cases with 70 infants and a foetal mortality of 8.6%. Since the foetal mortality of the two groups was similar it seemed reasonable to take all the cases together, giving a total of 170 cases with a foetal mortality of 8.2%. Methods of delivery were as follows:

	Primigravidae	Multigravidae
Normal delivery ..	36 (2 S.B.)	28 (1 S.B.; 1 D)
Forceps delivery ..	71 (4 S.B.; 1 D)	15 (3 S.B.; 1 D)
Caesarean section ..	17 (1 S.B.)	4
	124 (7 S.B.; 1 D)	47 (4 S.B.; 1 D)

There were six foetal catastrophes, in four of which some other factor, disproportion, toxaemia, etc., in addition to postmaturity, was present. There were also six catastrophes where there was no apparent difficulty other than the postmaturity. Of these one foetus died before the onset of labour, four showed varying evidence of distress during early labour and the foetal heart was inaudible before delivery, while the remaining case showed evidence of foetal distress and caesarean section was performed with delivery of a child showing an apex beat but in which respiration could not be established. It was thus evident that size alone was not by any means the most important difficulty experienced with the postmature foetus. These six deaths during labour were evidence that the placenta was incapable of supplying the foetus with sufficient oxygen. Additional evidence was presented by the high incidence of foetal distress in this series, 43 cases, of which 40 were in primigravidae.

The dangers of foetal anoxaemia and of decreasing liquor as postmaturity progressed made it important, Mr. Hamilton said, not to delay too long before induction of labour. In 146 cases of induction of labour by artificial rupture of the membranes there was one foetal death, whereas in 22 cases of postmaturity similarly induced there were four foetal deaths. It was reasonable, therefore, to induce labour when there was certainty that a state of postmaturity had been reached.

Mr. W. G. MILLS (Birmingham) defined maturity as the time when the foetus had derived maximum benefit from its intrauterine existence. There was at present no method available for its accurate determination.

Some authorities believed that the time necessary for maturation of the foetus could vary greatly and that cases of prolonged pregnancy were within physiological limits of the normal. There were certain changes in the foetus, however, which were not infrequently seen in cases of prolonged pregnancy, and these, he considered, were due to postmaturity. Morphological changes included an increase in weight, rigidity, and ossification, while there might be an alteration in the texture of the skin. In some cases there seemed to be actual arrest of growth or even loss of weight, with inanition and foetal distress. In addition to these physical changes the postmature foetus had been shown to undergo progressive asphyxia which might lead to death before labour, to asphyxia during the first stage, or to cerebral haemorrhage from minor trauma in the second stage of labour.

On account of these changes, which it was impossible always to diagnose before labour, Mr. Mills considered that no pregnancy should be allowed to continue more than 42 weeks from the last menstrual period, provided the menses had been regular and the date of the last period known. Surgical induction was preferred to medical induction in most cases.

Mr. A. A. GEMMELL (Liverpool), opening the discussion, said that to define postmaturity was very difficult. A method of assessing placental function should be sought. Mr. D. LATTO (Oxford) had reviewed 171 pregnancies which had gone 42 weeks or over at the Nuffield Department of Obstetrics. There had been nine stillborn babies and two neonatal deaths. Of the stillbirths four had gross abnormalities, and of the remaining five only one could be attributed to postmaturity, and this baby had weighed but 4 lb. 2 oz. and its placenta was small and infarcted. This syndrome of a small infarcted placenta associated with intrauterine death had been observed more than once in pregnancies ending before term. He had reviewed the last 154 stillborn babies, and of these 21 were of unknown origin. Only one was postmature. In his opinion, varying degrees of cephalo-pelvic disproportion were the cause rather than the result of postmaturity.

Professor E. C. CRICHTON (Capetown) stated that it was not clear that postmature babies were asphyxiated. Uterine inertia might be the principal factor, since the woman herself, her husband, and the nurse engaged were all fussing at the delay. He thought routine induction of labour was disastrous teaching. Dr. E. NEWLING (Croydon) wondered what was meant by a "ripe cervix." Mr. IAN JACKSON (London) said that the bigger baby often caused extreme difficulty in delivery of the shoulders.

Professor W. I. C. MORRIS (Manchester) did not think that either Mr. Hamilton or Mr. Mills had made out a strong case for the aetiology or management of postmaturity. He was against routine induction. Irregularities of the foetal heart were fallible signs of asphyxia. Did reduction in amount of liquor amnii really occur, or was it not a case of oligohydramnios from the beginning?

Replying, Mr. HAMILTON said genuine postmaturity was possible without disproportion. The cervix had to be taken up and admit a finger (be "ripe") before he recognized postmaturity. There were definite indications for caesarean section—for example, postmaturity by date with gross irregularity of the foetal heart. Mr. MILLS emphasized that death was due to asphyxia because of postmaturity. Individual selection of cases for induction was the ideal, but there was as yet no method of selection, and therefore routine induction was necessary.

(*b*) *Diagnosis of Early Pregnancy.*—Mr. F. STABLER (Newcastle-upon-Tyne) said that it was often forgotten that careful clinical examination was more decisive than biological tests. Considering symptoms first, he pointed out that in spite of all the possible fallacies given in textbooks it could be said that the commonest cause of sudden cessation of the menses during sexual life was pregnancy. The normal pregnant woman continued to eat in spite of her nausea, but a woman with some other condition did not. Abdominal enlargement occurred as early as six weeks, a fact reported by many pregnant women, even experienced multiparae. He believed the abdominal wall was shaking out reefs in preparation for the distension later sustained. In the supine position at this early time the abdomen showed flattening as a result of its increased laxity. If a young woman complained of frequency one should always inquire about her last period. Persistent breast discomfort was also significant.

Discussing signs, Mr. Stabler said that the palpable pregnant uterus was so soft it was difficult to be sure it was there, but it could be recognized as a soft lump which became better defined and then reverted to softness. The pregnant uterus was central, whereas fibroids or ovarian tumours were frequently asymmetrical. About or just after the 12th week the uterus lifted itself rapidly out of the pelvis to reach a point more than half-way to the umbilicus. This point was wrongly marked as 4½ months in textbook diagrams. Percussion of abdominal swellings was essential.

After abdominal examination it was easy to go on to examine the breasts. In a primigravida as early as the 6th week the alveola and nipple looked hyperaemic. Vaginal examination should include inspection: lilac coloration of the mucosa was very suggestive. The cervix felt soft. On bimanual palpation Hegar's sign was of little practical value. What was important was that the early pregnant uterus felt lumpy, rather like a small bag of cherries. This lumpiness might be due to asymmetrical implantation of the ovum, to minor degrees of double uterus, or to irregular areas of myometrium contracting under the stimulus of examination.

Every one of the symptoms and signs mentioned might be fallacious, but if all were looked for and each given its due emphasis the sum of the evidence would almost always be decisive.

Mr. A. A. GEMMELL (Liverpool) drew attention to early idiosyncrasies—for example, distaste for tea or cigarettes. He also mentioned the globular shape instead of flattening of the uterus. Dr. D. CRADDOCK (Clare) emphasized the significance of pain in the breasts, and of maintenance of raised temperature after ovulation, seen in those women keeping record charts. Mr. G. GORDON LENNON (Oxford) discussed rotation of the uterus to the right side, giving an impression of adnexal disease (Piskacek's sign). Mr. C. J. K. HAMILTON (Liverpool) drew attention to the fallacies of the Friedman test, and emphasized the help given by idiosyncrasies of diet and drink. He thought the suprapubic fullness described by Mr. Stabler might be due to an irritable bladder. Mr. FOURACRE BARNS (London) urged the importance of a tendency to constipation and increased vaginal discharge.

In reply Mr. STABLER said that if the uterus was palpated for long enough the fingers got tired and this might account for the apparent "disappearance" of the uterus noted in Palmer's sign.

(*c*) *Post-menopausal Bleeding.*—Professor A. M. CLAYE (Leeds) defined post-menopausal bleeding as bleeding occurring after at least six months' amenorrhoea and not due to pregnancy, in a woman whose periods had previously been reasonably regular. Every case required full investigation, as over one-third of the cases under review had malignant disease somewhere in the genital tract.

A careful history should precede a complete examination of the abdomen and pelvis. The cause found on examination might not be the only cause, or even the most important one. For example, benign cervical polypi were sometimes present below a cancer of the uterine body. If a fibroid was found in a woman complaining of post-menopausal haemorrhage the cause of the symptom must be carefully sought elsewhere—for example, in the corporeal endometrium.

It was not necessary for the patient's doctor to make an examination unless he wished to do so, but it was essential for him to see that she attended hospital without delay.

In all the recorded series of post-menopausal haemorrhage cancer of the cervix was the most frequent cause. In Professor Claye's series of 297 cases cancer of the cervix headed the list with 65 cases (22%). It was worth noting that of the 65 patients 34, over half, gave a history of three months' bleeding or less, so that one was not justified in regarding a case lightly merely because the history was short. Even with cancer of the corpus 9 out of 30 had bled for three months or under.

Oestrogens should never be given without adequate reasons. It was worth remembering that phenobarbitone was often as effective as oestrogen in relieving symptoms. Oestrogen was particularly to be avoided after a radium or *x*-ray menopause because of the risk of causing further bleeding, and after removal of both tubes and ovaries for endometriosis. Haemorrhage from oestrogen therapy occurred in two main types of case. First, when rather high doses had been given for a time and then stopped, oestrogen-withdrawal bleeding resulted some days after. Secondly, with smallish doses over a long period bleeding might occur irregularly during administration.

Mr. A. A. GEMMELL (Liverpool) agreed that the injudicious use of oestrogens was very important. Mr. CHARLES D. READ (London) said that if there was still bleeding two weeks after cessation of oestrogens the patient should be curetted adequately and thoroughly. It was well to remember that in 50% of cases of carcinoma of the corpus there was no uterine enlargement. If bleeding recurred and continued after irradiation and there was thought to be no carcinoma, or polypus, hysterectomy should be performed. There was always a cause—carcinoma, radium burn, low-grade salpingitis, or early granulosa cell tumour. Mr. IAN JACKSON (London) said that the bleeding after withdrawal of oestrogens was dark red, continuous, and ceased within 14 days. If bright red, irregular, and going on for more than a fortnight, oestrogens were not the cause.

Professor CLAYE replied, and thanked the officers of the section for the excellent programme provided.

SECTIONS OF MEDICINE AND PATHOLOGY AND BACTERIOLOGY

Wednesday, July 19

Atypical Pneumonia

Professor A. W. DOWNIE (Liverpool), a vice-president of the Section of Pathology and Bacteriology, presided at a joint meeting of these two Sections for a discussion on the clinical, aetiological, and pathological aspects of atypical pneumonia. Professor C. H. STUART-HARRIS (Sheffield), after reviewing the early work which led to the introduction of the term "primary atypical pneumonia," defined the condition as "a syndrome of respiratory tract infection characterized by varied symptomatology, by radiological changes of a particular character, and by lack of therapeutic response to the sulphonamides or

to penicillin." (Later, Professor S. P. BEDSON queried the latter part of the definition, since in his experience cases of psittacosis had responded clinically to both sulphonamides and penicillin.) Because of the varied and often obscure aetiology of this respiratory syndrome the epidemiological pattern was ill-defined. Atypical pneumonia associated with the development of cold agglutinins was an apparently sporadic infection with an increased winter incidence, particularly during epidemics of influenza and febrile catarrh. Evidence of infectivity was found in contact infections among hospital staff and in school and barracks outbreaks, while Dingle and his colleagues had been able to infect human volunteers with filtered sputum from clinical cases. Among the experimentally infected cases there were mild infections without lung changes, and it seemed likely that there were wide variations in the clinical picture. Young adults were most frequently affected. Explosive outbreaks of atypical pneumonia suggested infection with the rickettsia of Q fever, while cases of psittacosis and ornithosis occurred singly or in small groups of people who were in contact with infected birds.

Cases of atypical pneumonia were relatively rare among hospital admissions. They came from chest clinics, where radiological examination indicated the diagnosis, or were admitted under the designation P.U.O. because they failed to respond to chemotherapy. The patients were shivering, felt unwell, and had an irritative cough without sputum or with scanty mucopurulent material. Pain in the chest, if present, was dull and heavy, not sharp and stabbing like the pleuritic pain of lobar pneumonia. The pulse rate was higher than might be expected, and the respirations were also quickened. There were fine or coarse rales but not bronchial breathing or other evidence of consolidation. The leucocyte count was not unusually abnormal, and the diagnosis was made principally on the characteristic *x*-ray findings. Severe headache, pleuritic pain, and clearly defined lung opacities were suggestive of Q fever, but differential diagnosis depended on the demonstration of cold agglutinins or laboratory evidence of infection with rickettsia or with the ornithosis or influenza viruses. Most cases recovered after an illness lasting 1–2 weeks or sometimes longer. Chemotherapy had hitherto been ineffective, but good results were now being claimed with "aureomycin," although Q fever was perhaps less responsive than other rickettsial infections.

Aetiology and Diagnosis

Professor S. P. BEDSON (London), in discussing aetiology, thought the term "primary atypical pneumonia" was preferable to "virus pneumonia," since the syndrome included infections with a rickettsia (*R. burneti*) and a fungus (*Coccidioides immitis*). He mentioned also the giant-celled pneumonia of Hecht, which occasionally occurred as a complication of chicken-pox, measles, and other childhood infections. Speaking more particularly about psittacosis, he said that this form of pneumonia included a group of closely related infections —ornithosis, meningo-pneumonitis, feline pneumonitis, etc.— transmissible to man from their natural hosts, of which psittacine birds, fulmar petrels, pigeons, and domestic poultry were the most important. Diagnosis could be attempted by isolation of the virus from sputum or from aspirated lung juice, but the more usual procedure was the demonstration of antibody by the complement fixation test, using the group-specific heat-stable antigen of the psittacosis virus. More specific results could be obtained after absorption of heterologous antibody, but at present this was an exacting procedure. Positive skin reactions—the Frei test—could be obtained in 95% of cases of lymphogranuloma venereum with a group antigen made from either the psittacosis or L.G.V. virus, but cases of psittacosis were not so skin-sensitive. Preliminary tests with acid-extracted specific antigens also gave positive skin reactions in lymphogranuloma venereum more often than in psittacosis. He estimated that around 10% of cases of primary atypical pneumonia were caused by the psittacosis group of viruses. He discussed briefly the laboratory diagnosis of other varieties of atypical pneumonia and warned against acceptance of a rising titre of cold agglutinins as conclusive evidence of a specific infection.

Dr. THOMAS ANDERSON (Glasgow) felt it would be wrong to regard atypical pneumonia as being synonymous with non-bacterial pneumonia. The bulk of the cases of pneumonia admitted to his wards in Glasgow were associated with bacterial pathogens, but they differed from cases in the pre-chemotherapy era in their atypical symptomatology and in their age distribution; compared with pre-war years, about twice as many (nearly half of all the cases) were now in the age groups over 45 and under 1 year. He discussed a series of cases in which an accurate diagnosis could be made only after the most thorough clinical, radiological, and bacteriological examinations. They included such conditions as interlobar effusions, collapse of lung, pulmonary tuberculosis, staphylococcal and streptococcal pneumonia, and lung abscess. He urged the use of the lordotic and lateral positions in radiology of the chest, and thought that the lack of response to chemotherapy, particularly in older patients, might be due to poor tissue reaction rather than insensitivity of the infecting agent to the drug.

Histopathology

Dr. JANET NIVEN (London) discussed the histopathology of atypical pneumonia, based mainly on necessarily limited material. Some deductions could also perhaps be drawn from a study of experimental infection in the mouse with the Nigg virus (belonging to the psittacosis group); this showed that the primary reaction in the lung is related to the multiplication of the virus within susceptible cells in the epithelium of the terminal bronchioles and adjacent alveolar cells. The main features of this pneumonic lesion were the absence of widespread necrosis of bronchial epithelium as occurs in influenza; the early and extensive fluid exudate into the alveoli; the polymorphonuclear response, followed later by mixed mononuclear cells; and the fortuitous distribution of the lesions associated with the site of the "invaded" cells. In two cases each of psittacosis and Q fever pulmonary consolidation of uniform type superficially resembling pneumococcal lobar pneumonia was found. Fibrin was present, but the alveolar exudate contained mostly mononuclear cells. In psittacosis these were obviously derived from the alveolar wall, but in Q fever lymphocytes, monocytes, and plasma cells were also present. In Q fever, too, the cellularity of the alveolar wall was distinctive, and with selective staining large numbers of rickettsiae could be demonstrated. In one case of primary atypical pneumonia with a rising titre of cold agglutinins the consolidation was bronchopneumonic, with bronchi denuded of their lining epithelium and plugged with exudate. The alveolar exudate contained a mixture of polymorphs and mononuclears; the cellular infiltration of the bronchial wall was composed of lymphocytes and monocytes and not of polymorphs as in a bacterial bronchopneumonia. In these fatal cases the degree of consolidation was extensive enough to be appreciated by ordinary clinical methods.

Q Fever

Dr. M. G. P. STOKER (Cambridge) discussed some features of Q fever as seen recently in this country. Though usually mild, some 10% of the infections were severe, and the case mortality was about 1%. The onset was usually sudden. Severe headache with pain behind the eyes was a feature, and there was an absence of upper respiratory symptoms. Diagnosis was most commonly made by the complement fixation test; a titre of 1 : 64 or over was diagnostic of active infection, while a titre of 1 : 8 to 1 : 32 indicated past infection. The leucocyte count was low, the Weil–Felix reaction was negative, and cold agglutinins were absent or present in low titre. After the outbreak in the Royal Cancer Hospital, an endemic focus of infection had been discovered in Kent, and cases had also been traced in Devon, Somerset, Wilts, Gloucestershire, Denbighshire, and Oxfordshire. But despite fairly extensive investigation of sera from blood donors no infection had so far been found in East Anglia. Evidence of infection among dairy cattle had been demonstrated by antibody tests, and some cows were excreting the rickettsiae in their milk. Case-to-case infectivity was obviously low, and the natural infection was probably most often due to the inhalation of contaminated dust and straw or the drinking of infected milk. Attempts to find infected ticks in this country had so far been negative.

Dr. B. P. MARMION (London), speaking for a team at the Virus Reference Laboratory, Colindale, briefly analysed the serological findings (antibodies to influenza viruses A and B, *R. burneti*, psittacosis, streptococcus M.G., and cold agglutinins) with sera obtained from some 700 cases of respiratory infection, occurring mostly in London and the Home Counties. Positive results were obtained in 28% of the cases, which were divided clinically into influenza and febrile catarrh, lobar pneumonia, bronchopneumonia, atypical pneumonia, and P.U.O. Antibodies to the influenza viruses occurred more often in the influenza group than in any other, but were also present in 10–20% of the cases of the three pneumonic groups. Cold agglutinins (titre 1 : 32) and streptococcus M.G. agglutinins (titre 1 : 20) were equally distributed in the three pneumonic groups, but when the diagnostic titres were raised to 1 : 28 and 1 : 40 respectively (or a significant rise in titre) the incidence was higher in the atypical and bronchopneumonia cases than in those with lobar pneumonia. There was good correlation between the cold agglutinin and streptococcus M.G. agglutinin findings; these tests were only rarely positive in cases of influenza, psittacosis, and Q fever. Arrangement of the positive findings seasonally showed a localization of influenza and atypical pneumonia in the spring months with some evidence suggestive of mixed infection in institutional outbreaks. The value of examining sera obtained in both early and convalescent stages of infection was stressed.

In the general discussion, Professor DOWNIE wondered whether in some of the atypical bacterial pneumonias described by Dr. Anderson there may have been a mixed virus and bacterial infection, and also whether in fatal cases secondary bacterial infection might obscure the histological picture. Dr. M. MITMAN (London) had found in the literature a great variety of radiological appearances in atypical pneumonia, and thought the *x*-ray findings could not help in differential diagnosis. Dr. A. G. OGILVIE (Newcastle-upon-Tyne) asked if birds other than the parrot species carried the psittacosis virus, and suggested that the fulmar petrel, which was increasingly inhabiting the east coast of Britain, might be a dangerous reservoir. Dr. A. ANSELL (Liverpool) urged that there should be close co-operation between clinician and radiologist in the interpretation of the *x*-ray findings: he mentioned enlarged hilar glands on the affected side as a feature in atypical pneumonia. Professor R. CRUICKSHANK (London) asked whether, in view of the high carrier rate of the ornithosis virus among London pigeons and the rarity of the infection in man, this variant was less infective for humans than the psittacosis virus. He also suggested that, if "chloromycetin" proved to be as effective as aureomycin in the treatment of atypical pneumonia, it should be the drug of choice in this country, where it was now being manufactured synthetically.

In answer to some of the points, Professor STUART-HARRIS agreed about the difficulty of differential diagnosis radiologically, except that in bacterial infections the shadows were usually more dense. The usual dosage of aureomycin was 0.5 g. six-hourly for five to seven days; there was as yet insufficient evidence about the therapeutic value of chloromycetin. He felt that if cases were not fully investigated important observations might be missed—e.g., the endemic occurrence of Q fever in Britain. Professor BEDSON said it was difficult to distinguish the psittacosis from the ornithosis virus; he thought the low infectivity of London pigeons was associated with the fact that most of these birds were carriers and not acutely infected.

SECTION OF ANATOMY AND PHYSIOLOGY

Wednesday, July 19

The Lymphatic System

Professor A. DURWARD (Leeds), the president, was in the chair, and after he had welcomed the members Professor J. M. YOFFEY (Bristol) showed a film on "The Lymphatic System." The film started with a brief historical introduction, followed by a demonstration of the technique of interstitial injection of lymphatic vessels. Lymphatic pathways were then shown in the lower limb, including the technique of cannulating living lymphatic vessels, and the fate of particulate matter reaching a lymph gland. The cervical lymphatic pathway was demonstrated in cat, dog, and monkey by the absorption of vital dye after nasal instillation. The filling of the cervical pathway was also shown following injection of vital dye into the cranial subarachnoid space.

The thoracic duct was then cannulated, and its lymph seen both in an animal after a fatty meal and in an animal which had not been fed for some hours previously. Chyle and chylomicrons were shown, as was the rapid entry of vital dyes into the lymph after intravenous injection.

The film concluded with two animated diagrams, one indicating some of the main facts about the life history of the lymphocyte, the other showing a typical lymphatic pathway in man.

Dr. R. C. NAIRN (Liverpool) asked whether lymph could return to the blood by any other route than the thoracic and right lymph ducts. What happened if both these ducts were tied? Professor YOFFEY replied that there were species differences, and that in some animals there might be other lymphatico-venous anastomoses. Most of the experimental work had been directed towards tying the thoracic duct alone, and usually there was free communication between this and the right lymph duct.

Dr. M. MITMAN (Dartford) asked whether the tonsils and adenoids had a rich lymphatic drainage. Professor YOFFEY replied that their main lymph vessels were in their peripheral and deeper portions. Dr. F. M. SHATTOCK (London) asked whether proteins could pass from lymph to blood capillaries in lymph glands. Professor YOFFEY said that this was most unlikely, as the protein content of afferent and efferent lymph appeared to be identical. In reply to a question from Dr. R. G. WHITE (Nuneaton), Professor YOFFEY replied that, while in some cases a considerable number of plasma cells formed in the lymph gland, only a few seemed to escape into the efferent lymph.

Tissue Grafting

Professor G. McC. WYBURN (Glasgow) then read a paper on tissue grafting. Heterografts, he said, were between two animals of completely different species. They were employed mainly in lower vertebrates. Homografts were between animals of the same species. Most failed to survive. Grafts of ductless glands were, he thought, for the most part unsuccessful, despite numerous reports to the contrary. In mammals the most successful type of graft was the autograft, in which tissues were grafted from one part of an animal to another. He reported cases of nerve autografts in which, twenty months after two main nerves had been divided, a piece cut from the peripheral end of one nerve had been grafted on to the central end of the other. Some regeneration occurred, although no myelination was evident in the regenerating bundles, probably because of fibrosis. The interesting thing was that the central end of a cut nerve was capable of regeneration 600 days after injury and probably could retain this potentiality for several years. Nerve homografts, on the other hand, were uniformly unsuccessful, and ultimately became completely replaced by non-nervous host tissue.

Some homografts, however, could be an outstanding success, notably cornea and cartilage. This might be due to the fact that they contained a large proportion of ground substance, rich in polysaccharides, which would not evoke an antigenic response. Contrary to the opinion usually expressed, he had found that retinal homografts could survive.

The skin autograft retained many of its characteristics but acquired the local sensory pattern. This was shown clearly when skin was grafted from the abdominal wall on to the finger tips, though he pointed out that touch was the only sensation which could be tested satisfactorily. In such cases touch spots were much more numerous than they had been in the abdominal skin before grafting. In another case, where abdominal skin was grafted on the face, it was found that the threshold was considerably higher in the donor than in the grafted area. The explanation of these sensory changes, he believed, was that the grafted skin acquired a much larger cortical representation, and that it was alteration in the central connexions which determined the change in sensory pattern.

Sweat glands, hair, and pigment retained their original pattern. There was no increase in the number of sweat glands after grafting, but the type of sweating changed. From being thermal in the abdominal wall, it became emotional in the fingers. Some interesting results had been obtained with bone grafts in the anterior chamber of the eye. Homografts quickly died, but autografts, after looking somewhat unhealthy for 20–30 days, seemed to become revitalized. After six months there was clear evidence of new bone growth in the anterior chamber, and specimens of this were shown. Homografts of arteries and umbilical cord were sometimes quite successful, presumably because of the high proportion of ground substance.

Dr. N. M. HANCOX (Liverpool) asked whether grafts could effect chemical induction of new growth, and whether the successful retinal homografts had really been examples of this. Professor WYBURN said that his retinal grafts had been made subcutaneously, and he doubted whether the host tissues could induce new formation of retina in this situation. Dr. K. C. RICHARDSON (London) asked whether homografts of closely inbred strains had a better chance of success. Professor WYBURN said this was undoubtedly the case.

The Suprarenal Cortex

In the afternoon, with Professor R. A. GREGORY (Liverpool), a vice-president, in the chair, Dr. M. H. POWER, of the Mayo Clinic, spoke on biochemical studies on patients with hypofunction or hyperfunction of the adrenal cortex. In cases of cortical hyperfunction in Cushing's syndrome, associated both with adrenocortical tumour and with hyperplasia, certain abnormalities of the blood electrolytes appeared. There were increased *p*H and CO_2 content of the plasma, decreased chloride, and, usually, decreased potassium. It seemed unlikely that the association of cortical hyperactivity with alkalosis was accidental. The low serum K was probably due to excessive urinary excretion of K, and in fact could be corrected, though only temporarily, by the administration of potassium salts.

Recently Dr. H. L. Mason, of the Mayo Clinic, had shown that urinary corticosteroid excretion was unusually high in a case of Cushing's syndrome, and that half of it could be isolated as crystalline 17-hydroxycorticosterone (Kendall's compound F). This, he thought, was the first reported isolation of a cortical steroid from human urine. The evidence seemed to indicate also that compound F was the main steroid elaborated when the adrenal cortex was stimulated by A.C.T.H.

Turning to problems of renal hypofunction, Dr. Power discussed the treatment of Addison's disease with D.C.A. This substance effected a marked improvement in patients with adrenal insufficiency, especially in the control of electrolyte and water balance. But it left much to be desired, for, in harmony with its slight effect on glycogen storage, it did little for the patient in the direction of correcting various errors of intermediate metabolism, related to muscular weakness and a general sense of well-being. Could D.C.A. be replaced by other steroid hormones, or could it be profitably administered together with sugar hormones? This point was now being investigated, and Dr. Power's further remarks were in the nature of an interim report.

Cortisone could not replace D.C.A. in the treatment of Addison's disease, for it could not prevent sodium and chloride loss. In fact the evidence suggested that if, in a patient with satisfactory electrolyte balance, cortisone was substituted for D.C.A., it might even at first be a positive stimulus to electrolyte excretion; further observations would need to be made, however, for this point to be definitely established. However, after the marked initial increase in electrolyte excretion, cortisone appeared to be able to aid salt conservation to some extent. Furthermore it was noteworthy that cases of Addison's disease treated with cortisone alone could withstand much better than otherwise quite severe degrees of electrolyte depletion and haemoconcentration with extremely low values of plasma sodium. Tests on patients showed that compound A (11-dehydrocorticosterone) did not, in spite of its trifling difference in structure from cortisone, exert anything like the same profound metabolic effects.

Mr. K. C. RICHARDSON (London) said that the view that active growth took place only in the region of the capsule and zona glomerulosa, and that from this zone a steady stream of cortical cells migrated towards the medulla and died in the zona reticularis, was open to serious objection. All that could be agreed at the moment was that mitosis occurred among the capsular cells, probably providing cells to the zona glomerulosa, and that both the glomerula and the fasciculata showed a high frequency of division, which was not, however, entirely lacking in the reticularis.

According to the more recent views on the essential difference between the glomerulosa and the fasciculata, the former was the source of the 11-desoxy compounds, concerned mainly with electrolyte balance, while the latter was responsible for the gluconeogenetic 11-oxysteroid hormones. In the light of this concept it became necessary to visualize a source for the fasciculata and reticularis cells separate from that of the zona glomerulosa, or, alternatively, to assume that some narrow intermediate zone was proliferating in two directions, outwards into the glomerulosa, inwards into the fasciculata. The narrow sudanophobic zone, distinguished by its small cells, and situated between the glomerulosa and the fasciculata, seemed ideally situated for the purpose.

He thought that most of the histochemical techniques gave little information of greater value than could be obtained by the older method of Sudan staining. It was not clear as yet how much importance should be attached to the demonstration of phospholipids in the cortex.

Neural Control of A.C.T.H. Secretion

Speaking on the neural control of A.C.T.H. secretion, Dr. G. W. HARRIS (Cambridge) discussed the view put forward by Long that a preliminary release of adrenaline was at least a contributing factor in the secretion of A.C.T.H. following stress. Since rabbits with completely denervated adrenal glands, and also sympathectomized dogs, could still secrete A.C.T.H. quite readily in response to stress or to electrical stimulation of the hypothalamus, it seemed unlikely that adrenaline was of more than subsidiary importance for A.C.T.H. secretion. Sayers and Sayers had suggested that the secretion of A.C.T.H. by the anterior pituitary was determined by the concentration of cortical steroids in the blood. Stress increased the tissue utilization of cortical steroids, so that their concentration in the blood supplying the pituitary gland was decreased, and this evoked an increased output of A.C.T.H. This idea was tenable for acute stress stimuli, but it was difficult to see how such a mechanism would work during prolonged periods of stress. For blood to the pituitary gland had the same level of cortical steroids as blood to the rest of the body, so that, unless some change in pituitary threshold took place, it would seem impossible for a prolonged increase in the blood level of these substances to occur. Immediately the steroid content of the blood rose above the non-stress level the production of A.C.T.H. would diminish or cease, and the blood steroids would fall.

Dr. Harris then presented the results of some experiments, carried out in conjunction with de Groot and Colfer, which seemed to indicate that the release of A.C.T.H. by the anterior pituitary gland was under the neural control of the hypothalamus. It was found that restraint or electrical stimulation of the skin constantly evoked a lymphopenia in normal but not in hypophysectomized rabbits, though A.C.T.H. still produced a response after hypophysectomy. Denervation of the adrenal glands in no way affected the lymphopenic response. It was then found that stimulation of the posterior region of the tuber cinereum and mammillary body resulted in a lymphopenia which was similar in time relations and in magnitude to that following the stress stimuli or injection of A.C.T.H. Conversely, if the posterior part of the tuber cinereum or the mammillary body was damaged, the lymphopenic response to stress was abolished. Professor GREGORY asked what Dr. Harris thought, in the light of these findings, of Cannon's emergency theory of adrenaline secretion. Dr. HARRIS replied that in his opinion both types of stress response could occur.

Dr. M. VOGT (Edinburgh) said that the adrenal cortex did not store its hormones on a large scale, and gave off per minute seven times as much hormone as it contained; it was devoid of a nerve supply. Furthermore, the secretion of the cortex once it had been discharged into the blood, did not circulate

for any length of time but was rapidly removed by the tissues. These facts greatly affected the methods for assessing cortical activity, which could be done either by direct estimation of hormone in blood from the adrenal vein, by means of an elaborate biological method of assay, or more indirectly by studying chemical and histological changes in the cortex after the hormones had been discharged. There was also, in cases of prolonged cortical stimulation, the possibility of cortical hypertrophy.

On the basis of these methods it was now established that the adrenal cortex secreted hormone in response to a variety of conditions described briefly as "stress." Stress stimulated the formation of A.C.T.H., which was secreted by the anterior lobe of the pituitary and which provided the organism with increased amounts of steroid hormones in times of crisis. But A.C.T.H. also had the important function of maintaining the integrity of the cortex even when stress responses were not being evoked.

The question then arose: Was A.C.T.H. the only factor controlling cortical secretion? It did not affect all zones of the cortex equally, and in fact the glomerulosa not only did not atrophy after hypophysectomy, but sometimes gave the impression of being hypertrophied. Perfusion of the isolated suprarenal gland threw new light on the problem. Such a gland secreted appreciable amounts of cortical hormones, even when perfused with blood devoid of A.C.T.H. In the absence of A.C.T.H. two ways of increasing hormone output had so far been found: first, the supply of readily available energy in the form of adenosine triphosphate and related compounds; secondly, alteration in the electrolyte balance of the blood, particularly excess of potassium.

Professor J. M. YOFFEY (Bristol) then spoke on the adrenal cortex and lymphoid tissue. Though it now seemed quite clear that there was an important relationship between cortical hormones—more especially those oxygenated at C11—and the lymphoid tissues, the precise nature of this relationship was still not clear. It now appeared unlikely that there was any connexion between lymphocytes and the formation of gamma globulin or antibodies, nor in fact of any of the plasma proteins. The trend of recent work had been to implicate the plasma cell rather than the lymphocyte in antibody formation. Regressive changes in lymphoid tissue following A.C.T.H. seemed fairly well established, but how far this was associated with alterations in lymphocyte output had not yet been clearly demonstrated.

By a quantitative technique, absolute counts had been made of the nucleated cells in the bone marrow of normal guinea-pigs, and also of guinea-pigs six hours after the administration of A.C.T.H. and aqueous cortical extract. It was found that in these experiments there was a statistically significant increase in the lymphocyte content of bone marrow, and that there was if anything a slight increase in the number of damaged cells. Evidently one of the factors associated with the lymphopenia induced by steroid hormones might well be increased uptake of lymphocytes from the blood by the bone marrow. The significance of these changes in the marrow lymphocytes could not yet be assessed.

Dr. W. S. C. COPEMAN (London) asked whether these bone-marrow studies threw any light on the eosinopenia which followed the administration of A.C.T.H. Professor YOFFEY replied that they had found no significant change in the eosinophil cells of the marrow to account for the fall in the blood eosinophils.

SECTION OF CHILD HEALTH

Wednesday, July 19

Clinical Demonstration

A clinical demonstration was held at the University of Liverpool Department of Child Health, Alder Hey Hospital, in the morning. The clinical material provided a comprehensive picture of tuberculous and rheumatic infections in their various forms, and was supplemented by the exhibition of the results of pathological, radiological, biochemical, and electrocardiographic studies. Professor NORMAN B. CAPON, Director of the Department, briefly described the development of the department, indicating how hospital and local health authorities had co-operated in providing facilities.

Surgical Conditions in the Newborn

With Professor WILFRID F. GAISFORD (Manchester), a vice-president, in the chair, an interesting discussion on surgical conditions in the newborn was opened by Mr. DENIS J. BROWNE (London). He outlined the ideals to be aimed at in securing the best possible treatment, reviewed the present position, and suggested improvements for the future. Newly born infants, he said, should be examined as early as possible by persons possessed of skill as well as knowledge. Examination should have regard to details in the history of the pregnancy (maternal infections, blood pressure, toxaemia, maternal sizes, maternal sensations, and amount of amniotic fluid), and to the history of the birth, with study of departures from normal. Examination of the baby must include each system of the body and must be planned.

Mr. Browne commented on the rarity of systematic examination of the newborn, instanced errors and delays in diagnosis and in the methods of diagnosis, and regretted the lack of direction given to cases, the lack of surgeons with the necessary knowledge and technique, and the shortage of institutions with the necessary personnel and equipment. The present position had arisen from the main errors of exaggerated individuality. Among general principles which should condition future developments were analysis of the habits of mind necessary for the acquisition of new knowledge; rules for the testing and changing of knowledge; analysis of the diffusion of knowledge and of the instinctive resistance to which it gives rise in the human mind; analysis of the acquirement of skill as distinct from knowledge, of the use and misuse of standardization in technique, and of the benefits and dangers of specialization.

Centres of paediatric surgery should be established. Associated surgeons should have knowledge of infants, and should have the help of skilled anaesthetists and, most important of all, skilled nurses. There should be systematic study of the technique and results of the centres, and the findings of centres should be compared with one another and, so far as possible, with those in the profession in general.

Mr. R. H. FRANKLIN (London) drew attention to some of the less obvious congenital deformities which were responsible for a considerable number of neonatal deaths. He emphasized the need to remember that imperforate anus might be accompanied by deformities higher up in the alimentary tract. In any circumstances a suggestion of intestinal atresia called for exploratory laparotomy without delay. *X*-ray examination was of value in some but not all cases. The vomiting of bile was always suggestive. Any large maternity hospital might expect on the average one case of oesophageal atresia in a year. Treatment before 1938 had in the main consisted in gastrostomy. First attempts at anastomosis consisted in multiple-stage operations. The first completely successful direct anastomosis had been reported by Haight and Townsley in 1941. Of all cases of atresia of the oesophagus, 80% were characterized by an upper segment ending blindly at the level of the vena azygos arch and a lower segment arising from the back of the trachea.

Early diagnosis was essential for a successful operative result. The medical attendant and midwife attending confinements must be familiar with the condition and with signs and symptoms suggestive of it. Cyanotic choking occurred within a few hours of birth, especially if an attempt was made at feeding. Cyanosis due to excess mucus in the nasopharynx disappeared with aspiration. Spluttering and cyanosis accompanied by regurgitation after feeding suggest that the most likely diagnosis was atresia of the oesophagus. Suspicion that the condition existed called for aspiration of the nasopharynx and the stopping of feeding by mouth. If a well-lubricated rubber catheter passed through the mouth and down the oesophagus was arrested 10 cm. from the anterior alveolar margin, atresia was almost certainly present. Final confirmation was by radiography, but, if the nasopharynx was kept empty, the child's position changed frequently, and penicillin given intramuscularly, *x*-ray examination could be delayed for a day or two until the services of an expert radiologist were obtained.

Anaesthesia

Anaesthetic aspects of surgical conditions in the newborn were discussed by Dr. G. J. REES (Liverpool). Fundamental requirements were a good operating condition, little disturbance of vital processes, and protection against accidents. In the newly born, muscle tone was ill developed and respiration almost entirely diaphragmatic. Diaphragmatic movement should be reduced. There was no necessity for deep anaesthesia intended to serve as a protection against psychological trauma. There should be controlled respirations produced by hyperventilation, anaesthesia of minimal depth, and use of the endotracheal route to prevent regurgitation of fluids. Endotracheal anaesthesia did not give rise to stridulous breathing or laryngeal oedema.

Miss ISABELLA FORSHALL (Liverpool) urged that surgery of the newly born should not be developed in a way detrimental to general paediatric surgery. Lack of knowledge of the normal newborn infant makes the interpretation of radiographs difficult.

Discussing administrative aspects, Professor NORMAN CAPON (Liverpool), the president, suggested that for regional purposes the cases under consideration should be accumulated in one particular centre, and he emphasized the key position of the registrar in ensuring early competent diagnosis. Mr. P. P. RICKHAM (Liverpool) stressed that congenital malformations were second only to prematurity as a cause of neonatal death, and pointed out that the clinical picture of oesophageal thrush could simulate that of atresia of the oesophagus. Professor W. S. CRAIG (Leeds) supported Dr. Franklin in the importance to be attached to the observations of nurses and midwives. The paediatrician could further medicine and surgery of the newly born by assisting the midwife and pupil midwife in developing the art of clinical observation necessary for the early recognition of departures from normal. Dr. R. McL. TODD (Liverpool) referred to the difficulties of prognosis, and Professor GAISFORD to the responsibilities of teachers in the training of medical students, midwives, and nurses.

In reply to discussion Mr. BROWNE agreed about the desirability of light anaesthesia and the need for advising midwives and nurses. Mr. FRANKLIN said the risk involved in operation for oesophageal atresia must be accepted, and reiterated his plea for avoiding delay in laparotomy in cases of suspected intestinal obstruction.

SECTIONS OF DERMATOLOGY AND TROPICAL MEDICINE

Wednesday, July 19

Parasitology in Relation to Dermatology

With the president of the Section of Dermatology, Dr. R. STOPFORD-TAYLOR (Liverpool), in the chair, Dr. R. M. B. MACKENNA (London) opened the discussion. He said it was appropriate that 1950 should be the year of the joint meeting, as it was the centenary of the birth of P. G. Unna, who first pointed out the need for utilizing all the aids of modern biological science for the investigation of dermatological disorders. One hundred years ago epidemic typhus—a louse-borne disease—had been of immense importance to Liverpool and other great cities. Since that date the incidence of typhus had steadily decreased until it became practically extinct in the nineteen-twenties. But if the infection had been imported into the country during the recent war (as might easily have happened) the large number of women infested with head lice in certain districts might have made the control of epidemics much more difficult. Men had been practically immune because their short hair did not provide conditions of humidity and temperature suitable for lice to flourish. But even with women the introduction and widespread use of lethane hair oil, D.D.T., and other measures had greatly reduced the extent of the infestation, and it should now be possible completely to exterminate *Pediculus humanus* from this island. Three other measures for the prevention of infestations had been introduced by entomologists. The first of these was the use of "tetmosol" soap (i.e., soap containing 5% tetra-ethylthiurammonosulphide) for the control of scabies, recommended by Bartley, Unsworth, and Gordon in 1945. The second was the demonstration by Eder in 1945 that the administration of vitamin B_1 to people who were sensitive to flea-bites relieved the irritation and reduced the number of bites received. It was suggested that this somehow altered the nourishment provided for the fleas so that it became unfavourable and distasteful to them. However, this effect has not been confirmed with mosquitoes. Thirdly, in 1943 Mellanby showed that when a man was first infested with sarcoptes he did not have any discomfort during the first month, although he was infective to other persons; this was the stage of the "silent carrier." Symptoms and gross signs appeared only after the patient had become sensitized to the secretions of the mite. If a person was infested a second time he responded by inflammation and itching immediately. The practical conclusion from this work was that, when one case of scabies was discovered in a family, all the other members of the family or group should be treated as a prophylactic measure, since some of them were likely to be infested although they had no symptoms. Dr. MacKenna also spoke of "cat scabies," due to *Notoedres cati* or to *Cheyletiella parasitovorax*, which were really parasites of cats. Clinically the eruption consisted of small red urticarial papules which appeared on areas of the body (e.g., hands or neck) against which a cat might be nursed. The parasites could not establish themselves on the human body for long, so that the symptoms disappeared when the infested cat was removed, but the mites might have spread to the local mice, which would then reinfest other cats.

Reactions to Insect Bites

Professor R. M. GORDON (Liverpool) spoke on the reactions produced by arthropods directly injurious to the skin of man. These might be classified into four types, although several often occurred together. The first consisted of lesions due to mechanical trauma. Insects with clumsy mouth parts, like horseflies, caused more trauma than delicate insects like mosquitoes; and the myiasis-producing larvae which invaded the tissues caused still more. But in general the uncomplicated lesions due to mechanical trauma were seldom sufficient to cause any serious disturbance to the host. Lesions due to secondary infection formed the second group. Bacteria were usually introduced at a later stage and might cause serious trouble. But the wounds made by invading arthropods were not more liable to infection than those made by other means. The third type of reaction was due to the injection of substances which were normally harmless but to which the host had become sensitized as a result of previous exposure. When tsetse flies or mosquitoes bit persons in this country for the first time no reaction was observable. Similarly if tsetse flies fed on people at frequent regular intervals there was no reaction, but if they fed at infrequent irregular intervals many individuals became sensitized and localized allergic reactions appeared at the place of the bite. The offending substance was the saliva which the tsetse fly introduced into the wound. The same phenomenon was seen with other insects. Sensitization was often very specific. Thus some people would be allergic to anopheline mosquitoes but not to culicine ones, and some people might respond to *Pulex irritans*, the human flea, but not to dog fleas of the same genus. A few individuals claimed to be less attractive to blood-sucking insects than others, but their claim was usually fallacious. Laboratory investigations had shown that such individuals were as readily bitten by mosquitoes as others were, but they were not sensitized to the particular species in question and therefore did not notice its bite.

Professor Gordon pointed out that parasites were like poor relations who tried to get as much as possible out of their hosts but were careful to avoid causing irritation or inconvenience to their victim or patron because counter-measures might then be taken against them. The fourth group of lesions—those due to the injection of directly injurious substances—came into a different category altogether. These substances were developed by certain predatory arthropods which were non-parasitic, and the substances might be defensive (as in bees) or offensive to paralyse the prey (as in scorpions). As the speaker demonstrated with lantern slides of sections, these

venoms caused necrosis at the site of injection, with a surrounding inflammatory reaction; this was quite different from the simple small wounds produced by the blood-sucking arthropods.

Dr. L. E. NAPIER (London) described the dermal manifestations of parasitic infections such as leishmaniasis. In India two lesions were clearly definable. The first, Oriental sore, occurred in North-west India. It always remained localized. The second, post-kala-azar dermal leishmaniasis, was a sequel to generalized leishmania infection and occurred in endemic areas such as Bengal, being an example of host-parasite adjustment. It appeared one to two years after the successful treatment of the visceral infection, as circumoral erythema, with small areas of hypopigmentation on the face, neck, arms, or thighs. Later, a chronic nodular eruption usually appeared on the face and ear lobes. The diagnosis was made by taking a snip from a nodule and examining for leishmania. Treatment was by antimony compounds, the diamidines being apparently useless. The condition often resisted treatment for months and then suddenly cleared up.

Creeping Eruption

Dr. JOSEPH CAPLAN (London) spoke about creeping eruption in association with intestinal strongyloidiasis. As was well known, the classical creeping eruption was due to the larva of *Ankylostoma braziliense*, which burrowed in the skin between dermis and epidermis. The larva moved at the rate of 0.1–4 in. (0.25–10 cm.) per day, its path being marked by severe itching, erythema, and a raised weal. This might occur on any part of the body, but the usual sites were the feet or hands. Similar eruptions might be caused by certain other larvae which find in man an abnormal unsatisfactory host. The eruptions associated with strongyloides were different in character. In January, 1946, a patient was observed who had a tortuous linear urticarial weal affecting his buttock, starting near the anus and extending towards the iliac crest. It was intensely itchy and progressed at the rapid rate of 2–4 in. per hour. The patient was an ex-prisoner of war from Malaya, and suffered from strongyloidiasis. Since then the creeping eruption had been seen in many such prisoners of war and also in a few other patients who had been only in the Middle East. The main type of eruption was a narrow erythematous track about ¼ in. (3 cm.) wide; a slightly elevated urticarial line then appeared, and this left behind a reddish-brown pigmentation. It travelled, however, far more rapidly than the eruption due to *A. braziliense* did. Recently a much broader type of eruption, about ½ in. wide, had also been seen. The eruption had been distributed over most of the body except the head and the distal parts of the extremities. It was associated with infestation by *Strongyloides stercoralis*, which differed from other parasitic nematodes in being able to reproduce itself indefinitely in the same host. The larvae appeared in the faeces only intermittently, and this often led observers to conclude erroneously that cure had been effected. In these patients the eruption, and larvae, had persisted with intermissions for over five years, together with an eosinophilia of 10–25%. The creeping eruption could be induced by immersing the patient in a hot bath for 10–20 minutes, or by the intravenous injection of suramin. All attempts to obtain permanent cure of the strongyloides infestation had been unsuccessful, though many drugs had been tried. Palliative treatment by means of antihistamine drugs gave good symptomatic relief, but the possible danger of agranulocytosis must be kept in mind. No conclusive proof had yet been obtained that the creeping eruption was actually caused by the migration in the skin of strongyloides larvae.

Dr. D. G. FRESHWATER (Liverpool) spoke of the cutaneous changes in onchocerciasis which he had studied at Lagos and Leopoldville. The most characteristic lesion was the well-known subcutaneous nodule which (in West Africa) was found round the iliac crests and knee-joints and, less commonly, in the axillae and on the trunk and back. Nodules on the head were rare. More disturbing to the patient were the various forms of pruritus and prurigo. The pruritus was severe and paroxysmal, being worse at night or on the parts of the skin covered by clothing. At first no lesions were visible, but later there were urticarial weals and flat pruriginous papules on the arms, thighs, and abdomen. Secondary changes then took place, due to the trauma of scratching and to bacterial infection. Eventually the skin became thickened and nodular—the so-called "elephant skin"—and the corresponding lymph glands became enlarged and hard. If the skin was protected by suitable dressings for 2–3 weeks during the earlier stages most of the dermatosis would subside. Some cases of onchocerciasis also presented ill-defined plaques of non-pitting oedema.

Further contributions to the discussion were made by Dr. BETHEL SOLOMONS, jun. (Dublin), Dr. G. A. HODGSON (Cardiff), Dr. ERROL (Canada), Dr. C. A. HOARE (London), Dr. C. L. STATHAM (London), Dr. A. A. SANDOSHAM (Malaya), and Brigadier J. S. K. BOYD (London).

SECTION OF DISEASES OF THE CHEST AND TUBERCULOSIS

Wednesday, July 19

Resection of Lung for Pulmonary Tuberculosis

Dr. J. L. LIVINGSTONE (London), who was in the chair, expressed the regret of the meeting that the president, Mr. H. Morriston Davies, was unable to be present owing to illness. Dr. O. F. THOMAS (Liverpool) then opened a discussion on resection of the lung for pulmonary tuberculosis. He described a series of 200 resections performed in the Liverpool thoracic surgical service during the past two years, with a mortality of 2.5%. Resection was being used as an alternative to thoracoplasty, which had many disadvantages. Among these were the necessity for multiple stages, post-operative deformity, and failure to control the disease. Thirty per cent. of thoracoplasty patients were found to have a positive sputum on culture, though in many cases the sputum was negative by ordinary methods of testing and the patients were able to work. During the period under review resections had been performed on all patients considered suitable for surgical treatment, on the principle that it was better to excise diseased lung tissue than to collapse it—provided that resection was not likely to cause a greater reduction of lung function. Certain types of case were particularly suitable for resection. (1) Tuberculoma. The solitary round focus was rarely controlled by a pneumothorax and tended to cavitate eventually. A segmental resection was usually sufficient to remove such a focus. (2) Secondary bronchiectasis—fibrotic cavity systems with or without bronchial stenosis. (3) Unilateral cavernous disease—particularly tension cavities and cavities in the apex and anterior parts of the lower lobe and in the middle lobe. (4) Tuberculous empyema. This should be treated by pleuro-pneumonectomy. (5) After thoracoplasty, when the disease had not been controlled.

Criticisms of Resection

There have been three criticisms of resection. The first was that it would produce over-expansion of the remaining lung tissue. This had been prevented by employing a pneumoperitoneum with temporary phrenic paralysis on the side of operation and, when necessary, a limited thoracoplasty. The second criticism was that the complication rate would be high. In fact, this compared favourably with any other procedure. The third criticism was that healthy lung tissue would be sacrificed. This could often be avoided by doing a segmental resection. In the series of 200 cases there were 106 subtotal resections and 94 pneumonectomies with only 5 deaths. Very careful pre-operative assessment was of the utmost importance, and areas of disease which will remain after operation must have been stable for at least 12 months. Although the experience of this operation had been very encouraging, a final assessment of long-term results could not be made for five years.

Mr. F. RONALD EDWARDS (Liverpool), discussing the surgical aspects, asked why this operation had not previously been employed on a large scale. He thought that the present good results were due to improved technique and the use of

chemotherapy. Tuberculous lung tissue could now be resected with safety provided that the acute stage had been reduced by chemotherapy. At operation it was possible to feel the disease in the lung and to decide how much should be removed. All patients should be examined by bronchoscopy before operation, and endobronchial disease, when found, should be controlled by chemotherapy. Streptomycin was given as a routine for one week before and five weeks after operation. The post-operative course of these patients was easier than with thoracoplasty. Only one of the five deaths was directly due to tuberculosis; in this patient, who was a diabetic, there was a spread of disease and formation of a broncho-pleural fistula.

Mr. B. JOHN BICKFORD (Liverpool) described the results in 100 cases from the series which had been followed for six months. There were 57 pneumonectomies and 43 lobectomies, and the speaker discussed the important complications. There were two cases of tuberculous empyema with broncho-pleural fistula, and four of coccal empyema without fistula and four with. Five of the six cases of broncho-pleural fistula occurred after pneumonectomy. There was transient activity in 5 cases, and persistent activity in 10 cases (5 sputum-positive). In 11 cases there were other complications, mostly not serious. Of 30 patients who were followed for one year, 2 have a positive sputum.

Mr. J. R. BELCHER (London) described a series of patients operated upon by Mr. T. Holmes Sellors which included 82 lobectomies (mortality 4%) and 76 pneumonectomies (mortality 4.5%). The main indications for resection were: pneumonectomy—bronchial stenosis with total disease of the lung and persistent pyothorax with broncho-pleural fistula; lobectomy—tuberculoma, lower lobe cavitation, tuberculous bronchiectasis with bronchial stenosis, and rupture of a cavity. Thoracoplasty should not be abandoned. At present he was doing about six thoracoplasties to one resection. A thoracoplasty conserved some of the function of the lung—which was especially important in cases with bilateral disease—and would close 90% of apical cavities. The surgeon might set out to do a subtotal resection but be forced to do a total pneumonectomy for anatomical reasons.

In the subsequent discussion Mr. L. G. CRUICKSHANK (Leicester) described a series of 67 cases of resection with 3 deaths. There had been three failures to convert the sputum six months after operation. He found bronchography useful in demonstrating tuberculous bronchiectasis, which was an indication for resection. Mr. L. J. TEMPLE (Liverpool) supported Mr. Belcher in advocating the continued use of thoracoplasty. He had found resection useful as an emergency measure in cases of acute disease.

The chairman read a short communication from the president, Mr. H. MORRISTON DAVIES (Ruthin), in which he stressed that the limits of resection were not yet known. The operation might throw too much strain upon the opposite lung and reactivate disease within it. Also the patient might think that the disease had been eradicated and live without due respect and care. At the present time enthusiasm for resection should be tempered with caution.

Pain in the Chest

In the afternoon, with Dr. O. F. THOMAS (Liverpool) in the chair, Dr. DONALD LEEMING (Southport) opened a discussion on the clinical interpretation of pain in the chest. Coronary disease was an important cause of substernal pain. In angina this was gripping in character, often slight, and associated with effort. In coronary thrombosis the pain was severe and persisted. Pain due to a pulmonary infarct or an aneurysm might simulate that of coronary disease. Repetition of the pain was in favour of a pulmonary embolism rather than a coronary thrombosis. Pleurisy always caused pain, although the friction rub was often transient. There was commonly localized tenderness of the chest wall, and the pain did not occur on movement. Acute suppurative hepatic disease could involve the diaphragmatic pleura and should be remembered if pleurisy was diagnosed in persons who had resided in the Far East. Chronic pleurisy could cause a dull aching pain, worse in cold damp weather, without radiological evidence of disease. Some cases of pleural pain were due to unsuspected bronchiectasis. Other important causes of pain in the chest included spontaneous pneumothorax and massive collapse of the lung. The pain in bronchial carcinoma usually occurred late and was due to pleural involvement or metastases in bone, both of which indicated that the disease was no longer operable. Early ulceration of the oesophagus caused substernal pain on swallowing, while the pain of oesophageal carcinoma was boring in character.

Dr. D. RHODES ALLISON (Manchester) described the pain of cardiac neurosis. A careful and detailed history was essential in making a diagnosis. True cardiac disease might cause pain in unusual positions, often following previous pain tracks to the site of an old injury; it was frequently referred to the shoulder. Pain from a distant organ, gall-bladder, pancreas, or stomach, might be felt in the chest, and disease of the gall-bladder might closely simulate coronary thrombosis. Retrosternal pain which spread upwards could be due to coronary disease or be oesophageal in origin; a sliding oesophageal hernia might cause very severe pain in the chest. True cardiac pain was hard to localize and radiation into the arm was not pathognomonic, but a feeling of bursting in the arm and radiation of pain to the chin or jaw were diagnostic features. Fibrositis was usually recognized by pain on movement and the presence of finger-tip tenderness, but in middle age, and particularly in menopausal women, the differentiation from coronary pain might be very difficult. Painful muscle strain or injury might follow quite trivial trauma and, when acute, resembled the pain of coronary thrombosis. Chronic pain of this type could simulate angina. Bruising of the chest could cause a pain which persisted for years. Osteoarthritis of the spine often caused severe pain in the chest and kyphoscoliosis pain which developed in middle age. Association of the pain with change of posture suggested an orthopaedic cause. The fear of heart disease was so great that, like cancer, it should be diagnosed only on direct evidence.

In the subsequent discussion Dr. J. L. LIVINGSTONE (London) mentioned the difficulty of localizing chest pain due to orthopaedic causes. When spinal secondaries were suspected it was important to locate the pain as accurately as possible and take lateral radiographs at that level. Dr. J. R. CALDWELL (Birkenhead) mentioned the pain due to cough fractures and other unsuspected fractures of the ribs caused by very little exertion. Mr. J. R. BELCHER (London) said that pain in bronchial carcinoma was usually due to involvement of the ribs, which could be demonstrated by taking a penetrating radiograph. Mr. B. JOHN BICKFORD (Liverpool) described pain in the chest or upper abdomen resulting from dislocation of the tips of the ninth costal cartilage following strain or operation. Mr. F. RONALD EDWARDS (Liverpool) said that although the lung was insensitive its blood vessels were well supplied with sensory nerves. This might be the explanation of the deep, boring pain which occurred in pulmonary embolism.

SECTION OF OCCUPATIONAL HEALTH

Wednesday, July 19

Medical Examination in Industry

Dr. M. W. GOLDBLATT (Welwyn), a vice-president, took the chair and opened the meeting by suggesting that the medical examination in industry was a subject for investigation. Medical officers had developed their own system of medical supervision, but there had been virtually no published work on the method and value of these different systems.

Dr. LESLIE G. NORMAN (London) said that the conflict between the interests of the individual and the group must arise in the work of the industrial medical officer. He spent about 75% of his time in carrying out medical examinations and about 25% in dealing with working conditions. Many industries required the medical examination of applicants for work. These examinations served two aims: first to ensure the fitness of the applicant for the job and thus prevent ill-health from unsuitability which was detrimental to both the worker and the employer; secondly, to ensure that the applicant

was not suffering from any condition which increased the risk of accident and disease to fellow workmen and to members of the public. These aims were in the interests of both the individual and the group. It was not antisocial to advise a worker against taking a job for which he was unsuitable physically and mentally, yet it could be considered an infringement of the liberty of the subject to compel him to be examined and to deny him the opportunity of doing work he wished to do. Dr. Norman illustrated his point by mentioning that men over 6 ft. (183 cm.) in height not infrequently wanted to be bus conductors, yet the height of the upper deck of a bus was about 5 ft. 10 in. The man who was too tall was liable to occupational kyphosis and to continued frustration which he vented on himself and his passengers; he was inefficient and was disinclined to visit the upper deck. Pre-employment and periodical medical examination of industrial workers was one of the most powerful new weapons in the prevention of disease. Prevention still rested mainly on sanitation and inoculation. The early detection and correction of deviations from health could prevent many more diseases not at present being controlled by the traditional methods. There were three kinds of people—the healthy, the sub-healthy, and the sick—and one of the most profitable developments in medical practice in the next generation would be the detection of the sub-healthy and their restoration to full mental, physical, and social well-being. In this field the medical practitioner in industry had priceless opportunities.

Arguments Against Routine Medical Examinations

Dr. A. THELWALL JONES (Liverpool) said that, after a period of haphazard development in medical services in industry, a pause was necessary to take stock of achievements and to consider the value of the present system of medical examination of employees. His own experience was that examination of new employees, routine or periodic health examinations, and the medical check of employees engaged in hazardous processes were hardly worth continuing. The labour turnover was so high in most industries that the advantage of preliminary investigation was lost, and the usual conditions leading to rejection could well be observed by a competent labour officer. The examination at regular intervals of men working on hazardous processes rarely detected either constitutional or occupational disease. Symptoms preceded signs, and it was therefore usually the worker himself who noted these and reported to the medical officer.

In general, this type of examination was of value only in assessing the safety measures and efficiency of any particular plant and in providing the necessary contact between the worker and the medical officer. The routine general health examination should be condemned either in or out of industry as a safeguard of health. To advocate it was to deceive not only the patient but the doctor. Tuberculosis and inoperable bronchial carcinoma were only two examples of serious disease which could develop within a month or two after a satisfactory medical examination. It was of much greater importance to provide and encourage facilities for consultation than to perform routine examinations even in hazardous processes. Medical officers must not become preoccupied with job analysis, absenteeism, and sickness figures, and should revise their ideas on the prevention of organic diseases in industry. There was great scope for the early detection of organic disease if facilities existed for consultations and if doctors gained the confidence of the employees and remembered it was their duty to supplement the personal health services. Doctors should realize and impress on factory management the limitations of the routine type of medical examination, and they should develop to a greater extent than ever before adequate facilities for voluntary consultation.

Professor R. E. LANE (Manchester) said that there were far too many examinations of young persons in industry. They were examined in the last year at school, on entering industry, and yearly up to the age of 18. Future plans existed for a medical examination at county colleges. These too frequent examinations could do actual harm to the adolescent. For all medical examinations in industry one of the difficulties was lack of time. Some screening method was therefore essential. The very low incidence of occupational disease in this country was in part due to the statutory medical inspection of workers exposed to danger; an interview at regular intervals together with the appropriate tests enabled the doctor to observe early signs of disease and give confidence and comfort to the worker. It was a pity that the routine examination of this type was not applied to the card-room workers in the cotton industry, who were liable to suffer from serious chest disease.

Dr. F. H. TYRER (Port Sunlight) said that industrial medicine should not be regarded as a specialized branch of medicine. It was rather medicine practised under conditions which allowed the synthesis of preventive and curative medicine, which were so often divorced from one another. The industrial medical officer was favourably placed to practise social medicine with very wide terms of reference. He thought that Dr. Thelwall Jones was adopting a narrow and limited approach which might well be described as defeatist. Dr. A. J. ORENSTEIN (Johannesburg, South Africa) said that the medical examination in industry was essential in hazardous occupations and should not be confused with periodical medical examinations of the whole population for the detection of physical and mental defects. In the latter field the present knowledge and skill were inadequate for obtaining a high degree of efficiency. The position was quite different in assessing the dangers of exposure of individuals to specific and known hazards.

Winning the Confidence of the Worker

Dr. W. N. LEAK (Winsford) pointed out that the pre-employment medical examination enabled the doctor to win the confidence of the worker so that he would consult him in the earliest stages of illness or for other troubles. Dr. R. F. L. LOGAN (Manchester) said Dr. Thelwall Jones's criticisms were just and long overdue. Present methods of examinations in industry were relics of the last century. Most of the young persons suffering from gross disease did not reach industry. They had already been screened in the infant- and child-welfare clinics and by the school medical service. Public health was better than ever before, and people were educated to go earlier to the general practitioner or hospital. The ordinary clinical examination done routinely in Britain in 1950 was not adequate. New methods of examinations should be adopted. Dr. A. LLOYD POTTER (Widnes) said the essence of Dr. Thelwall Jones's thesis was that routine and pre-employment examinations should be replaced by voluntary consultation, but it should be realized that it was first of all necessary to obtain the confidence of the worker. The only satisfactory method was to continue and even extend the scope of the present examination. Contact between employee and medical officer was essential, and in these examinations much valuable evidence could be collected; even if it was negative, it was still important. It could not be stated categorically that there was no occupational background to the diseases mentioned by Dr. Thelwall Jones—such as hypertension and coronary atheroma. It was therefore unreasonable to suggest that the day of preventive medicine was over. The industrial medical officer was in an ideal position to accumulate and sift the medical evidence on these matters.

SECTION OF PREVENTIVE MEDICINE

Wednesday, July 19

Social Medicine from the Point of View of the M.O.H.

With Professor A. BRADFORD HILL (London) in the chair, a discussion on social medicine from the standpoint of the medical officer of health was opened by Dr. C. FRASER BROCKINGTON (Wakefield). He said that social medicine applied to the community included two types of service: (1) those (the earliest to develop) that affect the environment in which the community lives without necessarily any precise or particular design to affect the life of the individual, and (2) those more recent services which have the individual as

their objective—not the individual sick person as such but the individual as a member of a class of susceptible persons whose safety and health were of importance to the preservation of community health. To-day the deprived child, the handicapped, the aged, the chronic sick, and the factory worker must be added to those susceptible groups for whom services were early developed—the mother and her young child, the school child, the tuberculous, and those with venereal disease. Community social medicine placed the medical officer of health in a doctor–community relationship similar but distinct from the doctor–patient relationship of the family and hospital doctor. In the past the identity of community health had been insufficiently recognized, and many services which were in reality part of community social medicine had been dealt with as separate problems. The splitting up of the field of work was not in the interests of community health, which would benefit most from integration. The medical officer of health, with full supporting staff, should be given the whole responsibility for services to protect community health in his area—including industrial health. Areas should not be too large for him to make an intimate study of all health problems in his district—a population not exceeding 100,000–150,000. The specialist character of this work should be more widely recognized. Speaking of the new and powerful weapons provided by the National Health Service Act, Dr. Fraser Brockington stressed the need for closer co-operation between medical officers of health, hospitals, and general practitioners. As an example he cited the care and aftercare provisions of Section 28. The Radcliffe Infirmary survey had shown that owing to lack of follow-up 75% of the patients failed to benefit fully from hospital care.

Aftercare by Health Visitors

Dr. J. GREENWOOD WILSON (Cardiff) illustrated Dr. Fraser Brockington's last point by describing in detail the hospital follow-up scheme introduced in 1944 in the city of Cardiff. This had steadily won the appreciation of general practitioners and consultants. The key worker in the scheme was the health visitor, and her success, he thought, indicated that drastic amendment and extension in her training were unnecessary. The district health visitor knew the families and was the best person to give help when patients came out of hospital. Because it was impracticable for all health visitors to visit the wards of hospitals, a number of specialist health visitors were selected to act as liaison officers between the general body of district health visitors and the hospitals. The first hospital patients to be tackled in this way were those with diabetes and digestive disorders. Visits to hospitals were made by health visitors weekly to discuss the aftercare of individual patients with doctor, ward sister, dietitian, and almoner. On the patient's discharge from hospital a copy of the letter sent to the family doctor was sent to the health visitor, who visited the home as soon as possible to see that the regime recommended in hospital was carried out.

To supplement the home visiting, attendance by patients at a central public health clinic was encouraged. There the diabetic patients could test urine, and there they might be given a demonstration from a nutritionist appointed specially for this work on how to weigh, prepare, and cook food. At this central clinic a consultant physician, medical registrar, and dietitian were in attendance. In the aftercare of the patient with digestive disorders emphasis was placed on co-operation with the industrial nurse, the rehabilitation officer, and the agencies of "social security." The aftercare of the premature infant, patients with asthma or cardiac disease, and the mentally handicapped on discharge from a mental hospital were already or about to be included in the scheme. In all this work the health visitors lost no opportunity to keep in touch with the general practitioner, saving his time in much unnecessary detailed advice and supplementing his lines of communication with the hospital service—particularly with the hospital almoner, with whom the health visitors worked cordially together. Dr. Greenwood Wilson said that perhaps the greatest compliment was when the local paediatrician asked for two health visitors to accompany him on his ward rounds, where, as he was the first to point out, their work made a favourable impression on the medical students, so gaining in advance for the health visitor generally the confidence of the clinical practitioners of the future.

The M.O.H.'s Field of Work

Dr. EDWARD HUGHES (Reading), speaking on the future of the medical officer of health, asked under what organization social medicine would work. He thought it probable that Part III of the N.H.S. Act would be taken away from local health authorities and Parts II, III, and IV of the Act administered by a single *ad hoc* body. The medical officer of health would then be in danger of losing his local authority contacts as far as environmental factors such as housing, smoke pollution, etc., were concerned. There was great scope for the practice of social medicine by the medical officer of health under the National Assistance Act, and it must be hoped that his field would be further extended in the administration locally of industrial medicine. Greater facilities for training in medical statistics were needed. Dr. Hughes disagreed with Dr. Fraser Brockington about the need for extending the social welfare training of health visitors; he preferred to regard the health visitor as a technical officer.

Dr. B. G. GRETTON-WATSON (Chester) said that a good case could be made out for the return of chest clinics to the local authority. Increasing demand, costs, and complexity of curative services generally would inevitably lead to a breakdown. A revival of preventive medicine was then assured, and the time to put their house in order was now. A wider outlook on public health was necessary, and a first stage should be the incorporation of industrial health. Dr. G. WYNNE-GRIFFITH (Anglesey) said that the Part III services of the N.H.S. Act were, in effect, an extramural extension of the curative and rehabilitative activities of the hospital. Prevention had taken a place in the background. During the war it had been seen how effective prevention based on knowledge could be in the control of malaria in the Tropics. When it became known how to prevent the many diseases filling hospitals, then the real purpose of social medicine would be achieved.

SECTION OF PSYCHIATRY

Wednesday, July 19

Role of the Psychiatric Social Worker

With Dr. F. HOPKINS (Liverpool), a vice-president, in the chair, Dr. J. B. S. LEWIS (London) opened the discussion on the role of the psychiatric social worker. The function of the social worker had been defined, he said, by Eileen Younghusband as one of remedying deficiencies in the relation between the individual and his environment. This involved diagnosis of the need, knowledge of the social services available, and assisting the individual to make the best use of these resources so as to make a better adjustment. The psychiatric social worker (P.S.W.) did this in the field of psychiatry. She might be employed with the problems either of children or of adults, and Dr. Lewis spoke only of the latter. She should, of course, work in close conjunction with a psychiatrist; but it must be remembered that she had a skill of her own, and he could learn from her as she from him.

Her duties were multifarious. She had to explain to the patient, his relatives, employers, etc., what the hospital or clinic was doing; to take a social history; to follow up and help discharged patients; to co-operate with other social services; to help in administrative and in therapeutic work and in research; and, in fact, to carry out many other chores.

The present shortage of P.S.W.s was great, and their distribution through the country was uneven. It might be a good plan to evolve a regional organization in which mental-health social work would be directed by a P.S.W. Of about 1,000 workers needed, only 300–400 were available. From existing training centres only 60–70 newly qualified workers could be expected annually. Supply would not equal demand for many years. The Mackintosh Committee (of which Dr. Lewis is a member) had recommended that efforts at economy and better use of the P.S.W. should be made, and men should be recruited.

All P.S.W.s should have a recognized qualification, and training should be improved. All medical social workers might receive a common basic training. Skilled selection of students was essential. People with unsolved personal difficulties should be eliminated. Academic training, with all the advantages of lectures, seminars, and discussions, was desirable; and it was to be hoped that psychiatrists would be educated together with other members of the psychiatric team—P.S.W.s, clinical psychologists, etc. Much of the ground work to be covered by all members of the team was the same.

Professor D. R. MACCALMAN (Leeds) said that in child-guidance work the role of the P.S.W. was definite and therapeutic. Disorders of function in the adult were often the product of unsolved conflicts which had arisen in childhood. Readjustment was possible only when the patient relived these original situations, and by doing so reached a more effective solution. From this came the great advantage of treatment in early childhood, when the conflict was taking place. Child and parent could be treated together; but it was unwise for the psychiatrist to treat both, and he needed the help of the P.S.W.

When diagnosis was being made the P.S.W. must depend on the psychiatrist. When therapy was begun, the P.S.W. was set the task of explaining the emotional attitudes of the persons in closest contact with the child. She could work freely and independently, though she would exchange information with the psychiatrist, who was pursuing a similar line with the child.

Miss K. M. LEWIS said the clinical functions of the P.S.W. included those of an interpreter, of a collector of information, and of an aide in therapy. In a clinic for adults there was often much apprehension; she could make the initial interview easier and resolve misunderstandings afterwards. In a child-guidance clinic she had as a rule to make the first interview herself, and might then have to overcome parental hostility. The first interview involved the collection of information; but even in an adult clinic, where it might be the only contact the P.S.W. had with the case, it could be made helpful to the informant. In the child-guidance clinic it was the first of a series, so that the formation of a good relationship with the parents was more important than getting factual information.

The part the P.S.W. played in treatment varied in different clinics. She might in a busy clinic be absorbed in administrative work. In adult work she would lay emphasis on the patient's assets rather than his defects, and, often through co-operation with relatives, help him to make his best adjustment. In the child-guidance clinic therapeutic work was nearly always with the parents. She had to make it possible for the parent to let the child attend, to work within the existing framework towards allowing the child greater freedom to develop, to help the parents to tolerate qualities in the child which emerged under treatment, and to help the parents to gain insight. Work with parents was outstandingly successful, and it was here that the P.S.W. had her greatest opportunity of contributing to social medicine.

Miss E. THOMAS said the P.S.W. had to avoid either identifying herself with the patient or becoming a watchdog of the community. In finding homes and friends for mentally abnormal children and adults, one found in quite ordinary people a kind of tolerance and kindness which was not dependent on understanding. People, patients included, frequently transcended their apparent handicaps and limitations. The medium of the P.S.W. was that of ordinary human relationships. Awareness of a common humanity was more valuable than detachment.

Dr. K. CAMERON (London) said the work of the P.S.W. was with the relation of the individual to the environment. The doctor worked with the individual, and the P.S.W. had to adjust the environment. Social work had grown from giving material help to giving advice in making the best use of that help, and so to education and finally to involvement in the emotional situation. This was indeed a transference situation but was distinct from psychotherapy. Above all the P.S.W. had to deal, in coping with the parent, with someone who was *not* sick. Selection of suitable candidates was important, but should be restricted to the rejection of the patently unsuitable. Otherwise there was the danger of a restriction to a few types of personality and the growing-up of a clique.

Professor T. FERGUSON RODGER (Glasgow) said the question of how far the P.S.W. should be involved in psychotherapy was a difficult one and not yet settled. But the obtaining of a history from relatives was emphatically the doctor's duty.

Sir DAVID K. HENDERSON (Edinburgh), the president, said it was regretted there were so many kinds of training for mental-health workers. There should be a comprehensive course for all social workers, with specialization afterwards. At Edinburgh medical students, P.S.W.s, and others were instructed together, and it was an advantage for those who would later be working together to be brought together clinically. Professor Rodger's point about history-taking was fundamental. The psychiatrist must be responsible for this. He must be a physician first, and he could not hope to understand his patient if he relied on second-hand information from others. Selection of students was very difficult and could not be done in an interview. It was wrong to exclude those who had had a nervous breakdown, as they could often be most valuable. There was no objection to employing such people even in posts of responsibility. They often had an insight which others lacked. If a P.S.W. was given psychotherapeutic work this was not comparable with the duties of a masseuse or other medical auxiliary. One should not hand over such duties to a P.S.W., at least without a close and continuing liaison.

Mrs. CASTLE (P.S.W. from Liverpool), Dr. F. HOPKINS, and Dr. T. A. MUNRO (London) also took part in the discussion, and Dr. Lewis, Professor MacCalman, and Miss Lewis replied.

In the afternoon the Section attended demonstrations of modern techniques in child psychiatry at the Liverpool Psychiatric Clinic. They had been arranged by the Musgrove Park Hospital, Somerset; by Dr. F. H. Bodman, of Bristol; the Maudsley Hospital, London; the Moor House School of Speech Therapy, Surrey; the Liverpool Psychiatric Clinic; the Institute of Child Psychology, London; the Crichton Royal, Dumfries; the Alder Hey Hospital, Liverpool; the Royal Southern Hospital, Liverpool; and the School of Education, University of Manchester. They included talks, with film strips, on correlative work with psychological tests and E.E.G. and on the Lowenfeld mosaic test, as well as displays illustrating electroencephalography, psychometry, projection techniques, speech therapy, serial drawings, and puppetry.

SECTION OF ANAESTHETICS

Wednesday, July 19

Anaesthesia in the Newborn

The chair was taken by Dr. T. CECIL GRAY (Liverpool), a vice-president, and Dr. T. N. P. WILTON (Bristol) opened the discussion on anaesthesia in the newborn. Speaking on special problems of thoracotomy in these patients, he said that most of these operations had been for congenital atresia of the oesophagus. The infants were puny, often premature, and presented as emergencies. He warned against the pre-operative diagnostic use of barium, and thought that 1 ml. of lipiodol was sufficient for *x*-ray examination. An intravenous infusion was started, of either blood or dilute saline, and atropine given. Anaesthesia was induced with ethyl chloride and ether with oxygen. The cords were sprayed with amethocaine and the trachea was intubated. Ether and oxygen maintained anaesthesia, and extra relaxation, if required, was produced by vinyl ether. Controlled respiration was established when the chest had been opened. Suction was always to hand, and, by watching the mediastinum, atelectasis could be noted as soon as it occurred. The chest was drained by under-water seal. In cases of diaphragmatic hernia it was unwise to attempt complete inflation of the atelectatic lung. After operation the respiratory tract was cleared of secretion by suction and if necessary by bronchoscopy. It was necessary to keep the dead space as small as possible, and to this end he had constructed an endotracheal connector with an expiratory valve on it.

Dr. G. JACKSON REES (Liverpool) then described the differences, anatomical and physiological, between the newborn and the adult. The ribs, being horizontal, were of less importance in respiration. The neonatal lung had less area for respiratory exchange, it being, in terms of body weight, one-third the

adult value. But, to compensate, the infant had a high respiratory rate. The trachea was of relatively small diameter, and it was imperative that anaesthetic techniques should not increase the minute respiratory volume. There were also differences in the sensitivity of the respiratory centre and of the respiratory tract. "Bucking" was not seen and deep anaesthesia was unnecessary. Control of respiration was easily obtained, and there were not any indications for the muscle relaxants in these cases. He objected to cyclopropane, since not only was blood loss increased but post-operative shock was more common. Ether was the agent of choice. For premedication he used atropine only. The larynx was intubated with care, since trauma easily led to laryngeal oedema. Anaesthesia was induced with a flow of oxygen followed by carbon dioxide and ether under a gauze mask. After intubation, anaesthesia was continued with nitrous oxide and ether through a T-piece. Anaesthesia was light, with movements only just controlled. Controlled respiration was employed throughout. At frequent intervals the ether was turned off until movements returned to the limbs. In this way a rapid recovery was ensured.

In the discussion which followed, Dr. T. CECIL GRAY said he had used minute doses of relaxants successfully. Dr. G. ORGANE (London) described a case of tracheo-oesophageal fistula in which he had passed a tracheal tube into the oesophagus. Mr. DENIS BROWNE (London) paid tribute to the advances in anaesthesia in this type of surgery. He deprecated the use of chloroform, and said that the surgeon should play his part by learning to operate under light anaesthesia, perhaps with the child moving. He was suspicious of the value of curare in infants.

Dr. WILLIAM W. MUSHIN (Cardiff) cautioned against large doses of atropine in infants. The dose should be in accord with body weight, or hyperpyrexia or heat stroke might occur. This criticism also applied to the use of cocaine. Death easily occurred from overdose due to liberal spraying. The dead space of apparatus, together with the physiological dead space, might be greater than the tidal volume. Resistance to breathing must be small, since the infant was incapable of great effort. Any valve was superfluous. Dr. DOROTHY SPENCE-SALES (London) said she injected small quantities of penicillin into the oesophageal tube. She used local analgesia for the skin incision, with light general anaesthesia. Dr. R. F. WOOLMER (Bristol) said he controlled expansion of the lungs by a finger over the open end of a T-piece. He doubted whether local analgesia was justified. Miss ISABELLA FORSHALL (Liverpool) said that the strength of saline used for infusion should be determined by an estimation of the blood chlorides. Mr. P. FRANKLIN (London) said the function of the anaesthetist was to keep the pharynx dry. The risk of intravenous therapy was greater than that of dehydration. Dr. P. P. RICKHAM (Liverpool) advised early feeding. Dr. H. CURTIS (London) said he had measured the temperatures of infants in these circumstances and agreed with need for caution in giving atropine.

Nerve Blocks

In the afternoon the president, Dr. KATHARINE LLOYD-WILLIAMS, took the chair, and Dr. G. C. STEEL (London) opened the discussion on some therapeutic applications of nerve blocks. He said that the techniques were specialized and should not be treated as a side-line. The block could be done anywhere from the periphery, as for fibrositic nodules, to the roots, as in the case of intrathecal injection. The block could be simple, repeated, or continuous, in the latter case for days or weeks. He mentioned the intravenous use of procaine to resuscitate a patient apparently dead through overdose of adrenaline. Recovery was dramatic.

He had had a case of anuria following a mismatched blood transfusion. A nylon catheter was inserted intrathecally to the level of D5. A nupercaine block was maintained for 24 hours. The patient died on the sixteenth day, although the block had produced definite improvement.

Dr. J. B. HARGREAVES (Liverpool) had seen a patient have a pulmonary embolism while under anaesthesia and regretted not knowing of the value of the treatments described. Dr. W. W. MUSHIN (Cardiff) emphasized that the biggest field for these blocks was to relieve the pain of inoperable cancer. Colleagues were usually glad to refer such patients. Dr. L. RENDELL-BAKER (Cardiff) said he had used intravenous procaine to relieve pain after certain orthopaedic operations. Dr. C. E. SYKES (Manchester) confirmed the good results obtained in cancer cases. Dr. T. CECIL GRAY said he had established a "pain and diagnosis clinic." Dr. R. F. WOOLMER warned that the results of nerve blocks were unpredictable. The blocks were disappointing for intermittent claudication.

Analgesics

Dr. L. RENDELL-BAKER (Cardiff) then discussed analgesics in anaesthesia. He pointed out that as nitrous oxide anaesthesia usually involved hypoxia a supplement was indicated. This had ranged from chloroform to morphine. Thiopentone was commonly used, but he thought it more reasonable to use an analgesic. Pethidine for this purpose had been tried out in Cardiff with good results. If relaxation was needed "flaxedil" was added. The basic anaesthetic was nitrous oxide, and small intravenous doses of pethidine with or without flaxedil were administered at intervals. The patient was awake at the end of the operation and had some hours of analgesia.

Dr. J. G. STEWART (Auckland, N.Z.) described cases he had seen anaesthetized by this method at Cardiff. Dr. E. H. WINTERBOTTOM (Liverpool) agreed that analgesics would be better than thiopentone. Three patients of his had woken up during operation and, though curarized, had suffered pain. Dr. J. BULLOUGH (Southport) and Dr. G. R. HOPPER (Liverpool) said they preferred "trilene" as a supplement to nitrous oxide. Dr. J. W. DUNDEE (Liverpool) said he had used ether and pethidine in children. Dr. HILDA M. C. MACM. GARRY (Liverpool) asked about the incidence of chest complications. In reply, Dr. RENDELL-BAKER said no patients had woken up in the middle of an operation. The patients could cough within a few minutes.

Dr. S. B. DARBISHIRE (Ulverston) then described a case of sudden death during operation due to undetected paraganglioma. A woman of 35, fit though small, was to have a 5-rib thoracoplasty for a small apical cavity. She was intubated under thiopentone and curare, but within a short time, when the 5th and 4th ribs had been removed, she began to turn blue. The heart beat forcibly though fibrillating. In spite of adequate inflation with oxygen and the intravenous injection of procaine she died. At necropsy a small tumour 1¼ in. (3.8 cm.) in diameter was found at the bifurcation of the aorta. Section showed the tumour to consist of adrenal medullary tissue.

Dr. T. CECIL GRAY suggested that an anaesthetic might make these tumours secrete less adrenaline and that the treatment might be to inject adrenaline in these circumstances. Dr. A. C. FORRESTER (Glasgow) said he had seen eight cases of these tumours. They all had a severe fall of blood pressure when the pedicle was clamped, but this fall was readily controlled by adrenaline. Dr. F. L. DYSON (Bridgend) said that the fibrillation was the result of hypertension due to *nor*adrenaline. He suggested that the new drugs like "dibenamine" and "M. and B. 933F" be injected during the operation.

SECTION OF ORTHOPAEDICS

Wednesday, July 19

Tuberculous Arthritis of the Hip-joint

With the president, Mr. BRYAN L. MCFARLAND (Liverpool), in the chair, Mr. H. B. SEDDON (London) opened the discussion on tuberculous arthritis of the hip-joint. He reviewed the evolution of the methods of treatment from the mediaeval methods of the early nineteenth century, including the later partial excisions of joints, the use of immobilization and rational conservatism, the idea of early operative fixation, and the present practice of conservatism aided by late arthrodesis. The last method was being modified by the increasing use of chemotherapy. Modern views were based upon recognition of a

"natural history" of the disease, which must run its course under controlled conditions. After this, the best result was achieved in most cases by bony ankylosis, and the best method was that of ischio-femoral arthrodesis as described by Brittain. In their anxiety to master the local disease they had perhaps taken too light a view of the disability inseparable from stiffness. Therefore operations providing complete excision when the disease was quiescent deserved serious consideration: nevertheless reports of success were very few at present. Mr. Seddon dwelt upon some of the ill effects of conservative treatment, particularly those due to defective epiphysial growth in the region of the knee on the affected side. He mentioned also the problem of general skeletal decalcification, the effects of which could be minimized by mobilizing the patient with his retaining apparatus. Treatment with streptomycin was uncertain, but it was certain that with it there was a prospect of arresting the disease quickly, and therefore it was a matter of great urgency that tuberculous hip disease be recognized early so that such treatment could be given before the pathological changes had become irreversible.

Mr. R. S. GARDEN (Preston) gave an account of the early symptoms and signs of the disease, especially in children, who comprised 80% of cases. Pain and limp representing hypersensitivity of the joint might be the only features. The main point was that there was no characteristic sign and that all such cases demanded careful observation. Mr. DILLWYN EVANS (Cardiff), discussing conservative treatment, emphasized the need to understand the disease as a whole, since it affected the patient as a whole—socially and psychologically as well as physically. Treatment of the affected joint must not be an isolated circumstance; at the same time the surgeon must see to it that the patient did not suffer from deleterious sequelae which might be the result of treatment. The surgeon's role had been largely that of a passive spectator of the evolution of the disease under, it was true, the controlled conditions of rest and good hygiene. Now there were the gratifying possibilities (he could say no more at the moment) in the use of streptomycin. Mr. Evans reported upon 80 cases (not all disease of the hip-joint) thus treated, in none of which had streptomycin resistance been found; very few toxic effects were observed with the dosage of 1 g. daily for 90 days. The best results appeared to be in early cases, and this again showed the need for early diagnosis, for which, Mr. Evans said, much more frequent use should be made in doubtful cases of joint biopsy. Mr. E. N. WARDLE (Liverpool) noted that the aim of surgery should be to hasten the production of bony ankylosis. In children he believed that ileo-femoral arthrodesis with iliac grafting was the best method, because it was relatively simple and safe and there was less risk of complications.

Results of Treatment

Mr. J. DOBSON (Wrightington) analysed the results of treatment based upon a study of 320 patients with tuberculosis of the hip-joint. Forty-six per cent of patients were under 10 years of age. No proved case of infection by the bovine bacillus was discovered among those studied bacteriologically; at least 22% had a clear history of family contact with pulmonary tuberculosis. Twenty-one per cent of patients had multiple lesions (in other joints or systems)—above the age of 20 the percentage was 43. Premature fusion of knee epiphyses occurred in not less than 23% of patients under 15 years of age. In the complete series 79% were discharged from hospital as quiescent. The mortality rate was 15%, though the rate in patients with multiple lesions was 37%. In children 71% of the deaths were due to meningitis. At Wrightington the completion of conservative treatment by a fusion operation had not been done as a routine, but Mr. Dobson was now convinced of its necessity in most cases if deformity or recurrence of the disease—complications which were frequent in cases having only fibrous ankylosis—was to be prevented. He believed that the Brittain ischio-femoral arthrodesis was the method of choice in children under 12.

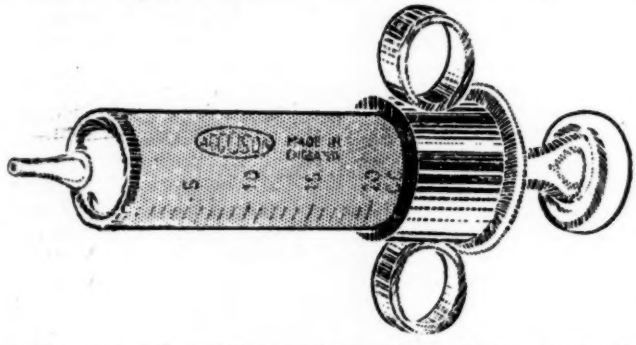
In the general discussion which followed, Mr. BRYAN MCFARLAND remarked upon the striking absence of bovine infection in Mr. Dobson's cases. He believed that osteotomy played an important part in altering the line of weight-bearing in the ischio-femoral arthrodesis, and he emphasized that surgeons were dealing with patients, not joints alone. Mr. G. F. FISHER (Liverpool and Johannesburg, South Africa) discussed ways and means of increasing the susceptibility of organisms to antibiotic drugs, in particular by "spreading" the influence of the drug through a wider area of tissue, and he mentioned the possibility, not yet proved, of achieving this by hyaluronidase or similar agents. Mr. NORMAN W. ROBERTS (Liverpool) believed that most hip-joint lesions were primarily synovial in origin, and that underlined the need for early diagnosis and treatment by streptomycin. Mr. H. OSMOND CLARKE (London) discussed the value of gland as well as joint biopsy as necessary aids to early diagnosis. Mr. SEDDON in his summing up stated that gland biopsy should first be done, but, if this was negative and the Mantoux test positive, then joint biopsy must be proceeded with. These examinations should be undertaken very early in the course of the disease.

Preparations and Appliances

CONTROLLER FOR THE ALL-GLASS SYRINGE

Dr. HAMISH M. MANN, of Glasgow, writes: A free hand to manipulate the patient's skin is an advantage in the injection of local analgesics. One-handed control of the all-glass syringe can be inadequate, as the first and second fingers of the injecting hand have to provide an equal and opposite reaction to the force of the injecting thumb against the small flange at the head of the syringe, power being dissipated in opposing these fingers in addition to the essential effort of flexion.

A stainless steel, or nickel, controller (see illustration), consisting of three rings, the centre ring—in a plane at right-angles



to the outer rings—being made to slide over the barrel and impinge on the flange of the syringe, has been devised, which gives better one-handed control and greater force of injection. It will fit all-glass syringes of the uniform outside diameter for which it is made—that is, in 5, 10, and 20 ml. sizes. The controller may be obtained from Messrs. Vicarey Davidson and Co., 162, Bath Street, Glasgow, C.2.

A similar device could be adapted to fit loosely the metal-glass syringes in which the metal base and nozzle are wider than the glass barrel; but, in view of M.R.C. War Memorandum, 1945, No. 15, on the care and sterilization of syringes, this has not been felt to be worth while.

I am indebted to Mr. Stewart L. Mann for help and advice, and to Mr. Wilfrid Burley for making the prototype.

The Minister of Health has considered the rents charged for houses and flats now owned by him and occupied by hospital staff. A circular from the Ministry states that the rents charged to hospital staffs will in general be fixed by committees and boards by reference to the rents normally charged for comparable properties in the neighbourhood. The hospital authority should seek the co-operation of the local housing authority in determining the appropriate rent.

Correspondence

Crisis in Tuberculosis

SIR,—The report on the tuberculosis service in Scotland published in the *Journal* (July 8, p. 61) is of great interest and importance to Great Britain as a whole. The price of neglecting or of dealing inadequately with the tuberculosis problem is probably more costly than free and wise spending on the lines suggested in the report. There will probably be general agreement with the main recommendations made, and the following suggestions deal only with details which may need to be varied if the recommendations are applied to the built-up metropolitan areas of England.

Care, aftercare, and the prevention of infection in the immediate environment of the patient are an integral part of the management of tuberculosis and are inseparable from the clinical responsibility for a case. It is a mistake, however, to think that preventive measures adequate to eradicate tuberculosis from the community can be planned on the basis of a chest clinic service—particularly with 200,000 population as the functional unit. Basic preventive measures embrace nutrition, housing, health propaganda, large-scale mass-radiography and tuberculin surveys, immunization of school leavers, and hostels and sheltered workshops for chronic infectious cases. They require planning on the basis of a unit much larger than a chest clinic area—a county or a hospital region, for example. At the present time the metropolitan local health authorities show little interest in basic preventive measures and appear to assume that a small contribution to the chest clinic services satisfies their responsibilities in the preventive sphere. This may ultimately prove to be a costly mistake.

The staffing of a chest service only by consultants, senior registrars, and housemen at a stage of training between graduation and registration would not provide a proper balance. There is room for registrar appointments in chest work, and it should not be assumed that the taking of a junior post in the chest service is necessarily a declaration of a man's intentions to specialize in chest diseases. A period of experience in chest work is valuable to those who intend ultimately to specialize in other branches. For those intending to specialize in chest diseases some thoracic surgical experience, possibly in a junior capacity, would be most valuable.

In estimating requirements for beds for the treatment of tuberculosis it was found in the N.W. Metropolitan Hospital Region that calculations on the basis of 2½ beds per annual death, 1 bed per 1,000 population, or from the requirements indicated by the waiting-list, produced figures of a similar order. By all three methods it was suggested that approximately double the number of beds actually available was required.

While it is true that otherwise empty beds in infectious-diseases hospitals may form a useful contribution for a crisis expansion of tuberculosis beds, the problem of nursing staff produces a limiting factor. Many inroads have already been made on infectious-diseases beds, and there may be a risk that if an epidemic occurs too small a reserve of beds may be disastrous.

It is important to realize that, while domiciliary treatment is an important contribution to the tuberculosis problem, it does not seriously diminish the requirements for hospital beds and is not an easy or quick answer to the problem as a whole.

The key to the problem is the recruitment of nurses.—I am, etc.,

Edgware, Middlesex. H. J. TRENCHARD.

SIR,—Dr. A. H. Dunkerley (July 15, p. 165) very rightly points out that in the present circumstances Great Britain can ill afford not to make use of available beds for the treatment of tuberculosis, even if these are in Switzerland. One sentence in his letter might be misinterpreted in relation to the fees charged in this sanatorium. These have not been raised. In Swiss francs the fees are approximately the same as before the 1931 devaluation of sterling, though the costs of maintenance have more than doubled. The average weekly fees then were eight guineas. They are now seventeen, owing to the fact that the present exchange value of the pound is only 12 francs, as compared with 25 before September, 1931. I believe Dr. Dunkerley wished to emphasize that if full occupancy of the beds here could be guaranteed all the year round the present fees could be markedly reduced, since the sanatorium is conducted as a non-profit organization.

One way to ensure full occupancy of the beds would be the creation in the U.K., preferably under the aegis of the N.A.P.T., of a co-ordination committee to arouse the interests of large employers, trade unions, ex-Service men's and women's associations, etc., and to allocate vacancies. Many such organizations are willing to pay for in full, or subsidize, treatment of their members, especially when this can be arranged without delay. Committees working with the anti-tuberculosis leagues in Holland and in Belgium are concerned solely with arrangements for the treatment in Switzerland of tuberculous Dutch and Belgians. Alternatively to the formation of such a committee in the U.K., this sanatorium could be taken over completely by the Ministry of Health and run at the cost of approximately that of a good regional sanatorium in Britain. There seems, however, little hope of any help from this quarter. It has been stated on behalf of the Ministry that there is no power under the Health Act either to acquire hospitals abroad or to restore the subsidies previously accorded by local authorities to patients undergoing private treatment. Further, there is no indication that the Ministry intends to remedy these deficiencies in the Act. As pointed out in the *Spectator* of July 7, a restoration of the subsidies would enable many hundreds of British patients to have early treatment in Switzerland. The present unfavourable exchange rate ought not to be regarded as a precluding factor against such treatment, since, with an adequate number of patients, costs can be relatively low. Further, scarcity of hard currency is obviously not an obstacle which could prevent hundreds of British patients from having early treatment in this country, as one and a half million pounds more than last year were allotted this year to British tourists in Switzerland. Apathy and prejudice in the U.K. in connexion with treatment facilities in Switzerland are greatly to be deplored from the point of view of hundreds of tuberculous patients, who are thereby caused avoidable hardship.—I am, etc.,

Montana, Switzerland. HILARY ROCHE.

Anaesthesia in Heart Surgery

SIR,—"Valvulotomy for Mitral Stenosis," by Dr. C. Baker, Mr. R. C. Brock, and Dr. M. Campbell (June 3, p. 1283) brings to mind an anaesthetic problem which in my view is far from solution. The problem is that of quiet induction with adequate oxygenation in the patient with cardiac disease. In Case 6 of the series the patient struggled during induction and his condition then became very grave.

Thiopentone will initiate anaesthesia quietly, but is open to objections, particularly where there is evidence of coronary artery disease. I believe that in some of these cases the blood pressure may be only just adequate to maintain circulation in the heart muscle. Thiopentone will lower the blood pressure, and my own experience with it in cases of adhesive pericarditis is very unfavourable. In other cardiac conditions in which the myocardium is affected the same argument would apply. It may be that lowering the blood pressure favours the formation of clots in the atrium and therefore of cerebral thrombosis.

Nitrous oxide induction is difficult to achieve with really adequate oxygenation, and cyclopropane is apt to cause arrythmias. Space does not permit discussion of the disadvantages or advantages of other agents, but anaesthetists may be interested to read of my experience with intravenous ether as an agent for induction. I thought originally that this would solve the problem in spite of inherent disadvantages in the method—e.g., tendency to cause thrombosis in the vein, and undesirability of adding appreciably to the volume of circulating blood in cardiac failure.

A solution of 5% ether in normal saline was used.

Case 1.—A young Bantu woman, suffering from adhesive pericarditis. There was some congestion of the lung bases, but the

general condition was fairly good. The "drip" was turned full on, and after about a minute she became very drowsy and did not respond to mild stimuli. A facepiece was applied at this stage and nitrous oxide and oxygen (30–40% oxygen) administered. Ether was cautiously added from the Boyle's machine, and the ether drip discontinued. The latter was replaced by procaine in saline (1 in 1,000). This induction was very quiet and was regarded as satisfactory.

Case 2.—A Bantu child aged about 10, suffering from adhesive pericarditis. A considerable degree of congestion was present in both lung bases. There was also bilateral pleural effusion, and the abdomen was very distended with ascites. The procedure described above was used. A facepiece was applied in the same way when the patient was very drowsy, but induction was not as quiet as in Case 1, and a little struggling took place. However, there were no further difficulties, and the operation was carried out without anxiety. The induction was regarded in this case as fairly satisfactory.

Case 3.—A European child aged 12. The diagnosis was patent ductus arteriosus. At operation this was found to be not the case, but another congenital condition not amenable to surgery was present. There was much evidence of failure present: the liver was grossly enlarged; ascites was present; the patient was dyspnoeic at rest. Anaesthesia in this case was undertaken with a good deal of trepidation. Induction was carried out as in Case 1. The patient was very quiet, and there were no difficulties during anaesthesia. In view of the gravity of the patient's condition induction was considered as very satisfactory.

Case 4.—A Bantu child aged about 11, suffering from patent ductus arteriosus. The child's general condition was very good. There was no special indication for intravenous ether, but it was decided to use the method in view of the good results in the previous cases. Induction was attempted as in Case 1, but in spite of the fact that the "drip" was running very rapidly there was little or no sign of drowsiness after several minutes. The intravenous ether was therefore abandoned and a state of anaesthesia attained with other methods. In this case obviously induction was unsatisfactory. There was, however, possibly some doubt about whether the ether-saline solution had been made up in the correct strength. If the weather is very hot ether tends to vaporize rapidly, perhaps before going into solution.

Surgery of the heart and of the great vessels is in a state of evolution at the moment. Anaesthesia must evolve with it. I hope this letter will serve as a small contribution.—I am, etc.,

Witwatersrand University, Johannesburg. D. C. DEVITT, Anaesthetic Section, Department of Surgery.

Spontaneous Dehiscence of Coverings of Incisional Hernia

SIR,—Mr. R. R. L. Pryer's interesting note (July 15, p. 167) stimulates me to record a similar case. The patient, an unmarried woman, aged 48, had undergone an operation for hysterectomy some ten years previously. About a year later she noticed a bulging of the scar, which gradually increased in size. On Sunday morning, October 30, 1949, the thin scar suddenly gave way while she was defaecating, and bowel extruded. An altruist of imperturbable fortitude, she refrained from disturbing her doctor on a day of rest, wrapped herself in clean linen, and, as she said, "took things quietly." On Monday she visited the doctor, who sent her to hospital.

Examination revealed a rather thin woman with a mass of matted lymph-covered intestine, about the size of a coconut, lying upon the abdominal wall at the level of the umbilicus. There was no constitutional disturbance. At operation, performed soon after admission, the extruded intestine was found to be the caecum with about two feet of ileum. After cleaning with saline, the mass of intestine, with its protective exudate, was replaced in the abdominal cavity. Redundant ulcerated skin was excised, the deeper structures differentiated, and the hernia was repaired. Recovery was straightforward.—I am, etc.,

Northampton. C. C. HOLMAN.

Hospital Failures in the Diagnosis of Tuberculous Meningitis

SIR,—The published results of treatment of large series of patients with tuberculous meningitis clearly show that the most important single factor in success is early diagnosis and institution of streptomycin therapy. General practitioners have responded well to the advice on early diagnosis given in the medical journals during the past year. Recent admissions to the Meningitis Unit of this hospital, however, have indicated that delay in diagnosis is occurring *after* admission of the patient to hospital. Three children who were recently transferred for treatment to this unit had been in other hospitals for three, nine, and eleven days, respectively, before the cerebrospinal fluid was examined. These children had all been sent into hospital with a tentative diagnosis of meningitis by their general practitioners. When these children were admitted, signs of meningeal irritation were recorded as absent. Tuberculous meningitis cannot be diagnosed with certainty without examination of the cerebrospinal fluid. When the diagnosis of tuberculous meningitis has been suggested by any doctor, it should never be ignored, however unlikely it may appear to be when the child arrives in hospital. Lumbar puncture is the only way to prove the suggestion right or wrong.

It does not appear to be appreciated sufficiently widely that tuberculous meningitis can be present without signs of meningeal irritation or focal signs in the nervous system. Indeed, it is during this early stage of the disease that we should strive to make the diagnosis. Many excellent accounts of the early clinical picture have been published (Craig, 1948; Rubie and Mohun, 1949; Illingworth, 1950). Persistent fever, mental apathy, or vomiting may be present as single abnormal findings, particularly in young children, for a week or more before more ominous signs appear directing attention to the nervous system. Lumbar puncture should be carried out whenever tuberculous meningitis is a possibility without waiting until it is a probability. Lumbar puncture, radiography of the chest, and tuberculin test (1 in 1,000 dilution) should all be carried out within 24 hours of admission.

Routine tuberculin testing of all children on admission to hospital will result in the discovery of positive reactors, otherwise unsuspected. If the cause of the illness in a positive reactor is not immediately apparent, and all the symptoms and signs not adequately explained, the cerebrospinal fluid should be examined forthwith. Many laboratories still do not estimate the glucose content of the cerebrospinal fluid unless specifically requested to do so. A quantitative glucose estimation should be carried out on all such specimens of cerebrospinal fluid as a routine. Glycolysis does not occur in fluids which do not contain pyogenic organisms or polymorphonuclear cells, so that it is unnecessary to have such fluids collected into a special bottle containing sodium fluoride, provided that the glucose content is estimated before any contaminant bacterial growth has occurred.—I am, etc.,

London, N.19. W. L. CALNAN.

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Hodgkin's Disease and Pregnancy

SIR,—Although recorded cases of this condition complicating pregnancy are few, recent correspondence in the *Journal* (April 22, p. 962; May 13, p. 1142; June 3, p. 1322; July 1, p. 47; July 22, p. 217) indicates that the association is more frequent than one had hitherto imagined.

J. C. Reed and J. E. Drabble mention ten cases recorded in the literature at their disposal. Since their case, B. Jolles reports one case, M. Hulbert two cases, and L. H. Walter two cases. I wish to record one case, making a total of eight new cases to add to the previous ten in the literature.

Although Browne (1946) takes a gloomy view of the prognosis and recommends termination, the experiences of Jolles, Hulbert, and Walter are certainly encouraging and form a useful nucleus to guide one in the difficult problem of whether to terminate or not. Perusal of their case histories does not reveal that any of their five cases had any immediate deleterious effect from continuing pregnancy.

Possibly improved methods of treatment, which was by deep *x*-ray therapy in all cases, are more effective than formerly. Jolles's case is still alive and well after six courses of deep *x*-ray therapy.

Case Report.—A woman of 31, pregnant for the first time, was attending the antenatal clinic of St. George's Hospital, her estimated date of delivery being May 6, 1950. Previously she had had no

illnesses. On November 28, 1949, at her second visit to the clinic she was noticed to have enlarged discrete rubbery glands in both posterior triangles, which were clinically typical of lymphadenoma. At this time she was approximately 18 weeks pregnant. The diagnosis was confirmed by biopsy. Chest *x*-ray showed enlargement of the upper group of mediastinal lymph nodes. There were no axillary or inguinal nodes to be felt. The spleen was not palpable. Red blood cells were 3,900,000 per c.mm. and haemoglobin 84%. The white cells were normal (9,200).

A course of deep *x*-ray therapy was given to the cervical areas in January, 1950. The nodes regressed rapidly under treatment. The mediastinal glands were not irradiated, in view of the pregnancy.

Further progress was uneventful, and after an easy labour of five hours she was delivered on April 29, 1950, of a male child, with the help of an episiotomy. Although the foetal heart had been heard shortly before delivery, the infant was stillborn and the umbilical cord (which measured only 14 inches (36 cm.)) was twice around the neck. Post-mortem examination of the infant showed no abnormality and gave no indication of the cause of the stillbirth other than the tightly stretched cord.

Subsequently her puerperium was normal, and *x*-ray of the chest on May 17, 1950, showed that the mediastinal nodes had regressed considerably. Further *x*-ray therapy was not given, and the patient is being kept under observation.

Although in this patient lymphadenoma became evident for the first time at an early stage of pregnancy, there was no clinical or radiological evidence that her condition had deteriorated during the pregnancy and puerperium.

The question of a future pregnancy is debatable, but if she and her husband are desirous and her clinical state is favourable, with no evidence of a recurrence, then pregnancy could probably be allowed.—I am, etc.,

London, S.W.1. J. L. WRIGHT.

REFERENCE

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Multiple Primary Carcinoma

SIR,—Some time ago I had under my care a lady of 68 who had a carcinoma of the colon removed 27 years ago, followed by successful removal of a growth of the caecum 12 years later. In 1946 she developed an enlarged liver, and I duly received a letter from the local hospital that she had hepatic carcinoma and that the prognosis was hopeless. She is, however, still alive. I formed the view that the lady had developed her own biochemical line of attack, and that a promising line of investigation would be opened if the serum of these carcinoma-resistant patients were thoroughly investigated. It is not always the scalpel that is the saviour—it may be body defences at work. Upon inquiry I found that no such line had been followed. We have all had, or heard of, patients of this type, admittedly rare, and there must be hundreds of such cases in the British Isles. Just as one of the great avenues of medicine has been opened up by observing how pregnancy influences the incidence of arthritis and pursuing the biochemical implications, so I feel that, by studying this very small select group of cases, important data may be forthcoming.—I am, etc.,

Birmingham. A. WISEMAN.

SIR,—The commentary in the *Journal* (see June 24, p. 1489; July 8, p. 107) on this subject serves to remind us that such cases are not too rare and there is always need for thorough examination. I am tempted to record the following cases.

Case 1.—Assuredly very rare; it concerns a woman with carcinoma of an ectopic bladder at the age of 59.

During the removal of a portion of the growth for pathological investigation my attention was drawn to a visible lump in the lower and inner quadrant of the left breast—an obvious and early scirrhus proved later by section. The sections of bladder and breast growths were reported by more than one pathologist to be almost certainly separate primary growths. The case was dealt with successfully in three operative stages: (1) left mastectomy and transplantation of right ureter; (2) transplantation of left ureter; (3) removal of bladder and reconstruction of the gap by crossing and transplanting part of each rectus muscle. The bladder specimen was presented to the R.C.S. Museum and was shown with lantern slides of the case at the Urological Section of the Royal Society of Medicine. The case was published in the *British Journal of Urology* (1945, **17**, 62).

Case 2.—A woman aged 70 had a right herni-colectomy for a polypoid carcinomatous mass of the caecum in a nursing-home on September 13, 1948. At the completion of the operation and during a final palpation for an alleged lost swab my fingers came upon a suspicious small hardening which proved to be an early string carcinoma of the pelvic colon. On March 29, 1949, the latter was excised. In June, 1949, a tumour arose out of the pelvis on the right side; a third operation followed and revealed bilateral secondary malignant ovaries: these were removed and very early pelvic peritoneal secondary deposits were noticed. The patient was still alive in June, 1950, but obviously dying from malignant ascites. The case is of interest on account of the presence of quite separate, differing, primary growths of caecum and pelvic colon, discovered simultaneously.

Case 3.—In January, 1941, a woman aged 43 complained of a bloody discharge from the left nipple, which was confirmed at operation as being due to a duct carcinoma. At the original examination I found an unsuspected scirrhus of the right breast, proved at operation by microscopy.

Finally, in addition to these three cases, I could record two further breast cases, where, some years later and after mastectomy for carcinoma, a typical and proved scirrhus appeared in the upper and outer quadrant of the opposite breast. I regarded the second breast growths as being separate primary tumours. I am aware that this conclusion is not easy to be sure about, but the good subsequent result and the situation of the growth well removed from the opposite side are possibly in favour of such a conclusion.—I am, etc.,

Torquay. W. ETHERINGTON-WILSON.

Vascular Changes in Diabetes

SIR,—Dr. E. P. Joslin's paper (May 13, p. 1095) and Dr. C. Shiskin's letter (June 24, p. 1490) require some comment. The punctate retinal haemorrhages are shown by Ballantyne to be microaneurysms affecting the veins. In my paper[1] on clinical study of diabetic retinal angiopathy I am inclined to the view that angiospasm plays a very important role; certainly the larger retinal vessels are less involved than the capillaries, and a striking phenomenon is an angiospasm of both lower extremities. Although my survey includes only 50 cases, none of them young, certain conclusions emerge—the duration of the illness is longer, the amount of insulin is larger, the angiospasm of the lower extremities is pronounced, but the general brachial pressure is lower than in the group of diabetics free from the retinopathy. The table accompanying my paper illustrates this.—I am, etc.,

London, E.1. N. PINES.

REFERENCE

[1] Pines, N., *Brit. J. Ophthal.*, 1950, **34**, 303.

A Leeds Commemoration

SIR,—Professor Matthew J. Stewart is retiring at the end of the summer after holding the Chair of Pathology in this University for thirty-three years. He has made notable contributions to pathology, and taken a leading part in the affairs of the Pathological Society, whose journal he has edited for sixteen years. It has been decided by his friends to commemorate his unique service by the foundation of a lectureship which shall bear his name and afford an opportunity, at least once in every generation of students, for a distinguished pathologist to visit Leeds and to discuss some important developments in pathology. In this way the name of Matthew Stewart would be kept in memory. It is also hoped to present a bronze medallion portrait of Professor Stewart to the Medical School. Subscriptions may be sent either to the National Provincial Bank, 2, Park Row, Leeds, or to the Honorary Treasurer, the School of Medicine, Leeds, 2. Cheques should be made payable to the "M. J. Stewart Retirement Fund."—We are, etc.,

C. R. MORRIS, (Vice-Chancellor)
J. W. MCLEOD, (Dean of the Faculty of Medicine)
W. MACADAM, (Hon. Treasurer)
D. F. CAPPELL.
D. CHAMBERLAIN.
H. R. DEANE.
J. H. DIBLE.
J. T. INGRAM.

Leeds, 2.

The Public and Cancer

SIR,—The excellent article by Mr. Malcolm Donaldson (July 1, p. 35) opens the question of an old but always very topical problem which has been neglected for some years. It raises two important issues: (1) making general practitioners more cancer-minded, and (2) education of the public; both aiming at early recognition of malignant disease and consequently increasing the survival rate after treatment (surgical, radiotherapeutical, etc.). The suggestion of holding lectures for general practitioners seems to be most acceptable and is also practicable. Local clinical societies and divisions of the B.M.A. could be of great help in this respect.

The second problem, on the other hand, regarding the education of the public, is a difficult and controversial one. The majority of the medical practitioners who deal with a large number of cancer cases would undoubtedly welcome a suitable form of education, as they are often exasperated by the considerable number of advanced stages which often could be avoided if the patients had some idea of the early symptoms. The methods and ways of this education, however, ought to be very carefully selected, as there is a real risk of causing a lot of harm by haphazard publicity. Education is a national problem, and as such it seems to be desirable that it should be dealt with on a national basis and not left in the hands of local authorities or individual cancer organizations without adequate supervision. One would think that organizations like the British Empire Cancer Campaign or even the World Health Organization ought to give guidance in this matter.—I am, etc.,

Coventry. K. SICHER.

Human Intestinal Coccidiosis

SIR,—Coccidia are protozoan parasites of the mucosal cells of the intestinal tract and occasionally of the liver of vertebrates. At least one species, *Isospora belli*, is known to infect man, but the condition seems to be short-lived. By alternating phases of schizogony and sporogony the life cycle is maintained and the elongated cysts, about 18–33 μ long, appear in the faeces. The following case illustrates the typical symptomatology and possible errors in diagnosis.

A European male, aged 41, complained a few days after returning by sea from Calcutta of mild diarrhoea (bowels open 3–5 times daily), some abdominal discomfort, anorexia, nausea, and morning sickness. In spring, 1947, he had had dysentery in Calcutta, diagnosed and treated as amoebic, and he was seen in London later in the year on account of the persistence of diarrhoea. His stools were then negative for *E. histolytica*, and, though he did not appear to be a case of sprue, he improved on folic acid. In February, 1948, he was again diagnosed in India as suffering from a relapse of amoebiasis, and in August was operated on for appendicitis, when the appendix was reported to be "full of amoebae." In July, 1949, he was again seen in London, when cysts of *Entamoeba nana* only were found in the stools. On examination in February, 1950, he appeared fit, and there was no sore tongue or abdominal tenderness or distension. The stools were pale and soft, and contained cysts of *E. nana* and scanty oocysts of *I. belli*. Blood examination showed a haemoglobin of 92% and an eosinophilia of 20%.

He was treated with capsules of bismuth salicylate, 1 g. thrice daily for a week, and all symptoms improved. Stools remained positive for *I. belli* for another 10 days, but have since been free, and the eosinophilia has dropped to 4%.

The abdominal discomfort, nausea, and pale unformed stools were typical of this infection and probably had no relation to previous intestinal amoebiasis due either to *E. histolytica* or *E. nana*, nor to a possible early sprue.

The infection with *I. belli*, which is supposed to be fly-borne, was possibly contracted in the Canal zone on his way home, for, although cases have been reported from Bengal, it is much more common in the Middle East and North Africa, and symptoms do not as a rule last for more than a few weeks.

I am indebted to Mr. W. J. Muggleton, F.I.M.L.T., for the pathological examinations without which this case would certainly have been misdiagnosed.

—I am, etc.,

London, W.1. C. C. CHESTERMAN.

Intussusception following Appendicectomy

SIR,—Intussusception as a complication of appendicectomy must be a rare occurrence. The following case is reported because of its unusual features, a similar case having been recorded by Bliss (1944).

The patient, a boy of 16½ years of age, was admitted to hospital on January 25, 1942, at 5.30 p.m., with the provisional diagnosis of acute appendicitis. The history was that at 11 a.m. on the morning of admission he had suffered an acute attack of abdominal pain followed by vomiting.

On examination he had abdominal tenderness, most marked in the right iliac fossa. His tongue was moist, his temperature was 98.4° F. (36.9° C.), and pulse 88. A diagnosis of acute appendicitis was made, and operation under spinal anaesthesia performed. Some free fluid was present in the abdomen, and the appendix, which was 8 cm. long and retrocaecal in position, was removed. It did not appear to be inflamed to the naked eye, and the pathological report later confirmed this. Nothing abnormal was detected in the abdomen.

The patient progressed satisfactorily until 48 hours after the operation, when, within two hours of the routine post-operative enema, he began complaining of severe colicky abdominal pain centred just above the umbilicus. The pulse rate had risen to 110, there was no vomiting, and the abdomen showed no distension and was not tender on palpation. Morphine was given, and the patient was seen again after several hours; the pulse rate was still rising, now 140, there was no diminution of abdominal pain, and he was perspiring freely. A diagnosis of post-operative intestinal obstruction was made, and a laparotomy performed. The peritoneal cavity was found to be full of free fluid, and an intussusception was present at the ileo-caecal region, ileo-colic in type and involving the lower 6 in. (15.2 cm.) of the terminal ileum. It was easily reduced and the gut was viable, peristaltic movements commencing almost immediately. The abdomen was closed and the patient returned to the ward, but he died eleven hours after operation.

From the pathological report on the appendix one can rule out acute appendicitis as the cause of the patient's abdominal pain on admission to hospital. Yet at the first operation no other cause for symptoms was found. Free fluid was present, suggesting that some pathological process had been at work. Is it possible that his pain and vomiting were due to an intussusception in the ileo-caecal area, which by the time the operation came to be performed had reduced itself? Aird (1949) states that "perverted peristalsis may give rise to intussusception," and that during an abdominal operation intussusception of a temporary nature may be seen.

The complication of acute ileo-colic intussusception on the second post-operative day, coming as it did within a short period after the routine enema, suggests that this enema might have been the cause. The intestinal irritation may have provoked exaggerated peristalsis in the terminal ileum which had recently already been the site of an intussusception. Perhaps intussusception in the adult, with spontaneous reduction, is a more common phenomenon than we are led to believe. It may account for a number of cases of abdominal pain that come to hospital but subside without operative interference.

I wish to thank Mr. H. T. Cox, consultant surgeon, Withington Hospital, for permission to report this case.

—I am, etc.,

Southport. MARTIN A. GOODWIN.

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Osler Memorials

SIR,—The 101st anniversary of the birth of the late Sir William Osler was celebrated on Wednesday, July 12, by the annual dinner of the Osler Club at the South Kensington Hotel, Queen's Gate Terrace, S.W.7. Those of us present—30 in all, including members of the club and their guests—were fortunate in having as our guest of honour Sir Henry Souttar, who delivered the Oslerian Oration. In his usual inimitable style, Sir Henry gave us a vivid description of his stay at the Oslers' home in Oxford, No. 13, Norham Gardens; and stressed that, in his opinion, Osler's greatness as a physician lay in his unusually keen faculty of observation. Osler, he continued,

won the hearts of all who came in contact with him by his charm of personality and kindness of heart. He was like a father to all undergraduates and young doctors who were privileged to know him. "The sparkling blue eyes of that olive-skinned little man (for Osler was not tall) seemed to look through you." Meeting Osler was an experience he could never forget, so vividly was it impressed on his memory. After the death of his only son, Revere, in 1917 in Flanders during the first world war, Osler was a broken man. As we know, he died two years later, on December 29, 1919.

Sir, how many of your readers know anything about Osler—"the greatest and most beloved physician of all time"? What are we in Great Britain doing, especially in these dark days, to keep his memory green? The Osler tradition will fade if succeeding generations of medical students are not constantly reminded of his outstanding contributions to the teaching of clinical medicine (especially in America) and to medical literature, with his 1,500 or more publications. We have not, like McGill University in Montreal, an Osler Memorial Library, with its 7,000 or more rare medical books bequeathed by Osler to his alma mater.

In the United States and Canada, where Osler's name is a household word, there are no less than nine clubs or societies to honour his memory: the Osler Historical Club, Medical and Chirurgical Faculty of Maryland; Osler Society of the McGill University Faculty of Medicine; Osler Reporting Society, Royal Victoria Hospital, Montreal; Osler Club of New York; Osler Club, Trudeau Sanatorium, Trudeau, N.Y.; Osler Clinical Society of the University of Vermont; Osler Society, University of Western Ontario; William Osler Society, Tufts College Medical School; Osler Society of Alberta.

There are six libraries or collections of Osleriana: Welch Medical Library, Johns Hopkins Medical School; Yale Historical Library; Duke University School of Medicine; Boston Medical Library; William Bradley Collection, College of Physicians, Philadelphia; University of California Medical School; and six memorial buildings or medical units: Bibliotheca Osleriana, McGill University; Osler Medical Clinic, Johns Hopkins Hospital; Osler Hall, Academy of Medicine, Toronto; science laboratories, Trinity College School, Port Hope, Ontario; Osler Ward, Duke University, Durham, N.C.; Osler Memorial Building, Philadelphia General Hospital.

Three orations and lectures exist: Osler Lecture, Vancouver Medical Association; Osler Memorial Oration, Canadian Medical Association; Osler Memorial Lectureship, Osler Memorial Association of Los Angeles.

There are two medals: the William Osler Medal of the American Association of the History of Medicine; and the Osler Medal, Vancouver Medical Association; and seven plaques, medallions, or tablets: Memorial portrait medallion of Sir William Osler, by R. Tait McKenzie for Johns Hopkins, a gift of Osler's associates and assistants at Johns Hopkins; memorial tablet in the main corridor of the Montreal General Hospital; Vernon plaque, Medical Library, Johns Hopkins Hospital; replica of R. Tait McKenzie medallion, McGill University Medical Library; dedicatory plaque, Trinity College School, Port Hope, Ontario; tablet, Trinity Church, Bond Head, Ontario; tablet, William Osler Memorial Building, Philadelphia General Hospital. . . . These are only some of his memorials. There is even a pullman car, "William Osler," regularly operating on the Los Angeles-to-Portland service of the Southern Pacific Railroad.

As the Sir William Osler Memorial Number of the *Archives of Internal Medicine* (July, 1949), published as a special edition by the American Medical Association, points out: "These tributes—almost countless, varied, impressive—come from groups of friends *with memories* (my italics), from an unbelievable number of persons who benefited from their contact with Osler . . . from colleagues and students who were inspired, guided, and helped by him. They desired to show their respect for him and to perpetuate his influence by these tributes."

There are, it is true, in England the Sir William Osler Medal, Oxford University; the Bronze Memorial Plaque by F. Vernon, of Paris, in the University Museum at Oxford (unveiled June 10, 1925); the tablet at Ewelme Church, Oxfordshire, to the memory of Sir William and Lady Osler and their son, Revere; Osler House, Oxford; and the Osler Sanatorium, Headington, near Oxford, as well as the Osler Club of London and the Osler Society of Oxford, already mentioned; but, unfortunately, no tablet on the walls of "The Open Arms," the Oslers' home in Norham Gardens, Oxford, bequeathed at his death to Christ Church, his old college. Are these tributes sufficient, considering all that Osler did for British medicine and for the Oxford Medical School in particular?

It is not to be forgotten that, in addition to his influence on medicine (especially that wielded by his famous textbook *The Principles and Practice of Medicine*, now in its 16th edition and translated into French, German, Spanish, and Chinese), Osler was elected president of the Classical Association and also of the Bibliographical Society of Great Britain.

How many well-educated persons in Britain, outside the medical profession, are even vaguely familiar with the name of William Osler? Could we not remove that sad thought by making a film of his life? Let Britain do justice to the fame of one of her most distinguished humanitarians.

Would it be too much to hope, then, that the next anniversary dinner will be attended by 300 and not 30?—I am, etc.,

Ealing, W.5. L. CARLYLE LYON.

Do Weed-killers Poison Food?

SIR,—In a recent issue (June 24, p. 1478) you comment upon two fatal cases of poisoning by dinitro-ortho-cresol where the action is not understood and no effective treatment known. You seem much concerned to allay any public anxiety over the use of this and other "very toxic" substances in relation to food production, in view of "world shortages." It is most disquieting that you appear to accept without question the assumption that food crops grown under these conditions are equally nutritious and perfectly harmless. Is this assumption justified? Do you feel satisfied that the differential weed-killers and latest insecticides that are absorbed into the sap of the plant leave no trace in fruit or seed? Surely, as guardians of the people's health, the medical profession should be concerned with the widespread use of virulent poisons in food production with what appears to be quite inadequate safeguards for those who eat the food products, as for those who use the sprays. This practice is growing despite a wider recognition of the nature of the "living soil." It would be less open to objection if the Ministry of Food were to ensure the marketing of branded goods (perhaps with the symbol of the poppy, soon to be banished from our cornfields), certified to have been grown under conditions where no virulent poisons have been used during cultivation.

Only in this way can those who feel in a position to form an independent judgment exercise any effective choice. Surely this choice should be open to those concerned with effects that may be less obvious and drastic than sudden death, even though you, Sir, would seem to be satisfied with the lesson "that each casualty has been the result of gross and avoidable contamination" of a careless and irresponsible worker.—I am, etc.,

London, W.1. ALAN MABERLY.

The G.P. at the Crossroads

SIR,—At last a ray of sunshine. I refer to the letter from Dr. Ivan Pirrie (July 15, p. 169). I feel I am voicing the gratitude of many besides myself when I thank him for writing it.

As a G.P. working in a London borough I have been finding satisfaction in this existence. According to the jeremiads you have been printing in a steady stream, Sir, I have no right to be other than miserable at my disgusting station in life. However, I persist mulishly in thinking that general practice has its delights as well as its miseries, its triumphs as well as its failures, and that doctors have been known on occasion to help their patients—those contemptible dogsbodies who, incredibly enough, are subject to the same, or similar, frustrations which are part of the present social set-up as the doctors themselves.

The main point is, Sir, that surely the moaning which is put out by our more doleful brethren is rather overdone? I think there are many among the rest of us who are nauseated by this perpetual whine of self-pity; and three hearty cheers once again for Dr. Pirrie's letter.—I am, etc.,

London, S.W.11. R. WINSTON.

Limbless Ex-Service Men

SIR,—There are to-day 36,000 surviving ex-Service men who have lost limbs as the result of their service in the two world wars. Three-fourths of them are 1914–18 war veterans whose average age is now 60. Among them are 1,400 men who have lost two limbs.

Despite their own handicaps, 12,000 limbless ex-Service men are united in true comradeship and service in 102 branches of their own association, B.L.E.S.M.A. (British Limbless Ex-Service Men's Association). Each branch has its own employment and welfare committees, with members serving on local disablement advisory committees and as voluntary visitors attached to war pensions committees. Aim of all this voluntary service is to ensure that no limbless ex-Service man needlessly suffers additional anxiety or hardship.

Many badly wounded men have a great deal of pride and will not themselves divulge their troubles, and the purpose of this letter is to invite organizations, doctors, the clergy, and relatives to refer to B.L.E.S.M.A. the details of all limbless ex-Service men who need a helping hand. B.L.E.S.M.A. also has a home at Blackpool for limbless ex-Service men left without relatives and who need special care and attendance. Beds are also available for those in need of short spells of convalescence or toning up. Inquiries should be sent to the local branch or to B.L.E.S.M.A., 37, Anson Road, Victoria Park, Manchester, 14.

A national appeal to raise funds for welfare work and the support of the B.L.E.S.M.A. home was launched by Lord Willoughby de Eresby in 1948, and donations may be sent to him at 25, Charles Street, Mayfair, London, W.1.—I am, etc.,

Manchester. G. CHANDLEY,
General Secretary,
British Limbless Ex-Service Men's Association.

Smallpox in the Unvaccinated

SIR,—Dr. J. S. Gemmill (July 8, p. 107) opposes the thesis that vaccination tends to spread smallpox by modifying and so disguising the disease that it easily escapes detection (as in the case of the Asian seaman, Mousa Ali, who was the cause of the recent outbreak at Glasgow), on the ground that sometimes atypical smallpox may occur in the unvaccinated and cause difficulty in diagnosis. He instances the case of the woman doctor in the Glasgow outbreak, who had a malignant attack in which death occurred before the true eruption appeared; and the case of a seaman on a vessel homeward bound from India, whose confluent attack was mistaken for measles and which initiated the Glasgow outbreak of 1942. These are the two types of case in unvaccinated subjects where mistakes are most likely to occur. But there is this great difference between unrecognized smallpox in the vaccinated and in the unvaccinated—viz., that in the latter the patient is always seriously ill and confined to bed, whereas with the vaccinated "missed" case the attack is clinically comparatively trivial and indeed may not come under medical supervision at all. The potentialities for spreading the disease are therefore generally much greater in the case of the vaccinated, and that is why, I submit, it is the vaccinated who are a danger to the unvaccinated rather than vice versa. Yet it was the assertion that unvaccinated persons were a danger to the community which was one of the strong arguments used in the past to justify compulsory vaccination and is still used by some people to-day.

This aspect of the vaccination question needs much more consideration and study than it has hitherto received.—I am, etc.,

Leicester. C. KILLICK MILLARD.

Morphine in Bronchial Asthma

SIR,—I feel that the letter by Dr. H. Herxheimer (July 15, p. 167) cannot pass unchallenged. Dr. Herxheimer states that in his opinion the use of morphine in severe asthma is justified because sedation is urgent. All will agree that sedation is the main requirement in the adrenaline-fast asthmatic; but although Dr. Herxheimer has seen no ill effects from morphine, I must say for my part I have seen quite a number of deaths directly due to its use. In fact, death from asthma is an extreme rarity in a patient who has had neither morphine nor pethidine. Personally, I usually use paraldehyde (freshly prepared), administered intramuscularly, and occasionally rectal ether.

Morphine is pernicious in status asthmaticus. Not only is it liable to depress respiration, and lead to circulatory collapse, but the bronchospasm is not infrequently increased in severity following its administration. We all know how frequently it is given, and often without ill effects. No doubt patients differ in their sensitivity to it, and in the moderate asthmatic no harm beyond the possibility of addiction is to be expected. It is, however, no solution of the problem; and the decision on when it is really necessary is apt to be somewhat elastic once any exception is made.

Finally, it cannot be "covered" by adrenaline. In my experience the asthmatic who has had morphine will not respond to adrenaline. Pethidine is only slightly less dangerous.—I am, etc.,

Newcastle-upon-Tyne. A. G. OGILVIE.

Timeless Tests

SIR,—The reputation of Lancastrian wickets for hostility towards batsmen was endangered by the performance of the XI selected for the meeting on the Adelphi ground which commenced on Thursday, July 20, for on that occasion most of the batsmen displayed a mastery over their environment appropriate to a timeless test. The mood of the "spectators" changed perceptibly as the innings wore on, and even a change in the order of batting—Nos. 10 and 11 advancing to 5 and 6 respectively—proved only illusory, and powerless to halt appreciably the deterioration in their morale. Many indeed recognized defeat—including myself, who left a by then sparsely populated arena, when the eighth wicket fell on Friday, July 21, at 00.21 hours.

Though otherwise the arrangements appeared to be faultless, it is suggested that physiological representation on the "dinner committee" may have been the means of adding, on this occasion, to the comfort—perhaps even the physical well-being—of those attending.—I am, etc.,

London, W.1. HAROLD C. EDWARDS.

POINTS FROM LETTERS

Poliomyelitis and Immunization

Dr. J. SLEIGH (Saxmundham, Suffolk) writes: It is established that the intramuscular injection of A.P.T. renders a child more liable to develop poliomyelitis. But in any but the most exceptional prevalence of poliomyelitis the likelihood of an unimmunized child taking diphtheria is infinitely greater than that of an immunized child taking poliomyelitis; and the likelihood of an unimmunized child dying of diphtheria is infinitely greater than that of an immunized child dying of poliomyelitis. The statisticians have done only half their work. It would have been better if no official pronouncement on the suspension of immunization had been made until they were able to say what was the incidence rate of poliomyelitis within an administrative area where morbidity and mortality from poliomyelitis after immunization were likely to be greater than morbidity and mortality from diphtheria with lack of immunization. . . . If such information cannot be given, then nothing should be done to suspend diphtheria immunization. . . . When the time comes to renew it, it will not be easy to persuade the mothers that what was bad for their children yesterday is good for them to-day. There will be twice as much work to do in the same time and with the same facilities, and the children will be older than the age at which it is agreed that immunization is desirable. All that has been achieved is that those who wish to do best for their children are increasingly doubtful what to do, and that those who are indifferent to their children's welfare have another excuse for doing nothing.

Kent County Health Department's District Officers and their assistants are training to use the deaf-and-dumb alphabet and sign language. There are over 700 people in the county with whom the only means of contact is by sign-and-finger speech. Instruction classes are now being held fortnightly at the County Hall, Maidstone, and at Margate. The officers taking the courses are doing so voluntarily.

Obituary

C. M. STEVENSON, M.D.

Dr. Claude Maberley Stevenson, of Cambridge, died on July 14 at the age of 71. He was born in London and was the son of Sir Thomas Stevenson, of Guy's Hospital. He was educated at Uppingham, St. John's College, Cambridge, and Guy's Hospital. He qualified in 1904 and held house appointments at Guy's Hospital and at the East London Hospital for Children. Soon afterwards he graduated M.B., B.Ch., and he proceeded M.D. in 1910. Dr. Stevenson returned to Cambridge in 1909 and was in general practice there until his death, except for an interval of two years in the R.A.M.C. in the 1914–18 war. During all his time in Cambridge he did ophthalmic work as a part-time specialty, and for over twenty years he was a clinical assistant in the eye department of Addenbrooke's Hospital.

Stevenson was a member of the Fabian Society and played an active part in the work of the Labour Party in Cambridge. He was always interested in medical politics, and he regarded it as the duty of every doctor to play his part in the democratic organization of the profession. This he did himself with enthusiasm as an untiring member of local government, N.H.I., N.H.S., and B.M.A. committees. In the local organization of the B.M.A. he was secretary of the Division for many years, and in turn chairman of the Division—and an efficient chairman—and president of the Branch. Dr. Stevenson was a representative at the Panel Conference for twenty years and on the Representative Body of the B.M.A. for fifteen years. During the important period from 1943 to 1948 he was a member of Council and active on several of the central committees of the Association, particularly the Ethical Committee. His views generally were progressive but not extreme. His medico-political work was characterized by his keenness to maintain the high standards and good name of the profession and his shrewd sense of what was practical politics.

In sport his chief interests were tennis, of which he played an excellent game to within a month or two of his death, and cycling. He was local president of the C.T.C. and of its road-racing offshoot. He did a great deal of timekeeping for road races, and up to the spring of this year used to be out on the road at 6 a.m. on Sundays, week after week, for this purpose.

In 1910 Dr. Stevenson married Dorothy Verran. As a member of the Cambridge Borough Council and various committees and chairman of the Cambridge Hundred Houses Society she was a companion to him in public work. She died in 1938 and he succeeded her in the latter office. They had a son, who is an accountant, and a daughter, who is a doctor. In 1941 he married Johanna, the widow of the late W. H. Duke.

Dr. N. E. Waterfield writes: As chairman of the Central Ethical Committee during most of the time whilst Stevenson served as a member I should like to pay my tribute to the service he rendered to the profession in this capacity. Before the meetings he always carefully studied the agenda and came ready to express his views, views which one could always depend on as being based on high ideals and principles and at no time yielding to expediency. This being so, he was appointed by his colleagues to serve on many subcommittees in the sure knowledge that they could rely on him to make a valuable contribution to any committee on which he served. As one of the more senior members of the Ethical Committee his loss will be severely felt.

Dr. DUNCAN GORDON COOPER, who died on July 4, was in general practice in Waterlooville, near Portsmouth. Born in 1884 in Calcutta, he studied medicine at the University of Edinburgh, and graduated M.B., Ch.B. in 1908. He joined the I.M.S. in the following year and retired in 1926, with the rank of major. In the same year he proceeded M.D. and settled in practice in Waterlooville. Dr. Cooper quickly established his reputation in Portsmouth and its neighbourhood, and was indeed an outstanding example of the best type of general practitioner. His practice covered all classes of the community, and to all he was kindly, considerate, and conscientious, a man on whom everyone relied and who never failed. He took a great interest in the work of the B.M.A. He was for many years a member of the executive committee of the Portsmouth Division and in 1938–9 was chairman of the Division. He represented his constituency at the representative meetings in 1941, 1943, and 1944. During the 1939–45 war he was president of the Red Cross, chairman of the Ambulance Committee, and president of the District Nursing Association at Waterlooville. Apart from all these activities, Dr. Cooper had considerable artistic talent, and his hobby was water-colour painting. He exhibited in the Southern Arts Society, of which he was a member, and also in the Royal Scottish Academy of Edinburgh. He held the respect of his patients and of his colleagues, who were always glad to make full use of his judgment and knowledge. Of an equitable temperament and pleasing personality, he was always a source of strength in local affairs, and everyone will remember him with affection. He leaves a widow and a son, who won the D.F.C. during the war and was hoping shortly to join his father in practice.—T. B.

Dr. SEYMOUR RICHARD GLEED died suddenly at the age of 68 at his home at Finchley, London, on June 28. He was educated at Mercers' School and St. Thomas's Hospital, taking the conjoint diploma in 1907. After serving as senior house-surgeon at the Scarborough Hospital and Dispensary and house-surgeon at the Hospital for Women, Brighton, he settled in practice at Church End, Finchley, in 1909. In May, 1915, he joined the R.A.M.C. and was later mentioned in dispatches. After his demobilization in 1919 he took over the practice of Dr. C. Barker and with it the appointments of district medical officer and public vaccinator, which posts he held till they were abolished by the recent Health Acts. Dr. Gleed was a member of the honorary medical staff of the Finchley Memorial Hospital, and since 1937 had been police surgeon for the area. As recently as July, 1948, he had been appointed a Treasury medical officer. He was assistant honorary secretary of the old Finchley and Hendon Division of the B.M.A. in 1922–3, and was chairman of the Finchley Division and of the Local Medical War Committee from 1939 to 1944. A freemason, he belonged to the Honor Deo and Child's Hill Lodges. He married Florence Masters, who survives him, and they had a son and a daughter. His son, Wing Commander Ian Gleed, D.S.O., D.F.C., was killed in April, 1943, a blow from which Dr. Gleed never completely recovered. It was a great consolation to have his daughter working in partnership with him since 1948. He was a keen philatelist and gardener, being particularly proud of the garden at his Herne Bay bungalow. A conscientious and hard-working practitioner, he was much esteemed by his patients and by his colleagues. Dr. Gleed's health had not been good for several years, and in January, 1948, he had an attack of coronary thrombosis from which he made a fairly good recovery, but he never spared himself in spite of a certain amount of physical disability, and a second attack on June 28 proved fatal.—W. S. R.

The National Association for the Paralysed has issued a useful pamphlet for patients entitled "How to Obtain Help in Sickness." It gives information on what certificates and extra food may be obtained by sick people, what preparations should be made before going into hospital, and how help may be obtained on leaving hospital. It is obtainable for 6d. from the Registrar, National Association for the Paralysed, 1, Dorset Buildings, Salisbury Square, London, E.C.4.

Medical Notes in Parliament

THE MEDICAL BILL

Further Consideration in Committee

Consideration of the Medical Bill in Committee of the House of Commons was completed on July 18.

Debate was resumed on the amendment to Clause 15 proposed by Dr. CHARLES HILL (*Journal*, July 22, p. 225).

Mr. ANEURIN BEVAN, Minister of Health, said that since the debate was interrupted on July 14 he had had some discussions on the matter, and there was some point in the contention that where a doctor had appeared before a tribunal under the National Health Service Act and had been acquitted he ought not to be tried twice, and the papers in such a case ought not to be sent to the General Medical Council. He was prepared to give an undertaking that the Health Department would not send on the papers in such cases. It must be made clear, however, that decisions of the tribunal were published, and the G.M.C. might take cognizance of them and start proceedings themselves. If in such a case they asked for the papers, then it would be generally agreed that the papers would have to be supplied.

In view of this statement, Dr. Hill withdrew his amendment, and the Clause was agreed to.

Striking Off the Register

On Clause 17 Dr. BARNET STROSS moved an amendment to subsection (1) to provide that a medical practitioner should not be liable to be struck off the *Register* merely on conviction of any felony or misdemeanour without due inquiry by the medical disciplinary committee and a finding of infamous professional behaviour. He said it was reasonable to suggest that all the G.M.C. should try the practitioner for was whether he was guilty of infamous conduct in a professional sense, quite distinct from any offence he might have committed against the law.

Mr. BEVAN reiterated that one of the purposes of the Bill was to protect the doctor, but the other was to protect the public. What was suggested by the amendment was intolerable. It provided that if a doctor had not committed an offence against his patient it did not matter what he had done. The G.M.C. had not only to try a charge against a doctor, but it must positively seek to protect the public. If it was found that a doctor had committed a series of serious offences the G.M.C. must be free to consider whether such a person ought to remain on the *Medical Register* and enjoy the protection given by that.

There followed a long and inconclusive discussion on the effect of the amendment as it concerned doctors convicted "by any court in the United Kingdom or the Republic of Ireland."

Sir HERBERT WILLIAMS said that it was monstrous that the position of a registered practitioner in the United Kingdom might depend on behaviour which was against the laws of the Republic but not an offence in this country.

Dr. CHARLES HILL described it as an "odd situation" that if a practitioner went to Ireland for a holiday and got into trouble which resulted in a conviction, that would automatically be reported to the G.M.C., but should he go elsewhere abroad he would be safe.

Mr. BEVAN interjected that it was because there was a single *Register* for the two countries.

Dr. HILL said there were practitioners from Canada, Australia, New Zealand, and South Africa on the *Register*, just as there were Southern Irish practitioners. If the Minister was saying that offences committed in the countries from which practitioners on the *Register* were gathered must be reported to the G.M.C., then he must be logical.

Mr. BEVAN eventually agreed to look at the matter again, without promising to alter the Bill, and the amendment was withdrawn.

Mr. WALTER ELLIOT moved to delete subsection (2), which provides that for the purpose of any inquiry by the G.M.C. disciplinary committee a finding against a doctor in any matrimonial proceedings in the High Court that he had been guilty of adultery with a particular person should be conclusive of that fact.

He said that this difficult matter arose out of the Spackman case. The G.M.C. should not retry a case, but it was possible that different facts, or facts putting a different light on a case, might become evident in a hearing before the G.M.C. He asked also why it should be only a conviction that a doctor had been guilty of adultery with a particular person which should be accepted. There were other offences of which the practitioner might be judged guilty which would inevitably bring out the stigma of being guilty of infamous conduct in a professional respect, such as a jury's verdict of justification for proceedings for slander, or a bastardy order made by magistrates. It had been held in the past that an investigation by courts for one purpose should not be taken as more than prima facie evidence that there was a case for inquiry before another court.

Mr. BEVAN said the subject had been discussed in the House of Lords, and it was there generally agreed that there would be something quite wrong in the G.M.C. retrying a case already tried in the High Courts. On the other hand, where information was laid with the G.M.C. and a decision of a court had already been given, in a case not involving an offence against a patient, and in complex cases which were not criminal cases, the G.M.C. would hold itself free to reconsider the offence.

Mr. JOHN HAY recounted the circumstances of the Spackman case, and said that if a doctor was brought before the G.M.C. and charged with professional misconduct, and the only evidence against him was the finding of the superior court that he had committed adultery, according to the clause as it stood he was immediately found guilty and could not call any other evidence.

Mr. BEVAN dissented. If the G.M.C. accepted as a fact that he had been guilty of adultery, it did not necessarily follow that the Council would proceed to remove him from the *Register*.

There ensued a long and technical legal discussion on the different rules of evidence in civil and criminal cases and the circumstances attending undefended divorce suits. Mr. ELLIOT eventually interrupted with the observation that there was danger of "what was called prolonged debate arising." He repeatedly pressed the Minister to examine the matter again to see whether some accommodation could be reached between those who took opposing sides in the argument. Mr. BEVAN finally agreed to examine whether some form of words could be found which would remove "the atmosphere of finality" from the subsection.

The amendment was withdrawn and the Clause agreed to.

Appeals

On Clause 19 Mr. R. FORT moved an amendment to increase from 28 days to three months the time during which a person struck off the *Register* might lodge an appeal.

Mr. BEVAN rejected the proposal, on the ground that a doctor who had been judged unfit to hold his practice could not be allowed to go on doing so for three months. The Medical Defence Association and the British Medical Association had suggested 21 days.

The amendment was negatived, and the Clause agreed to.

Visitors of Medical Schools

Mr. I. J. PITMAN moved to add a new subsection to provide that the G.M.C. should not send its visitors to inspect any place of instruction under the direction of any body which at any time during the preceding six years has been in receipt of a grant from public funds through the University Grants Committee. He said that these visitors would in practice be inspectors. The G.M.C. was already able to judge the quality of university teaching by the products which came from it, and it was a most dangerous precedent to divide the responsibility for day-to-day management of courses of instruction between the university and the Council.

Mr. BEVAN said the Clause was put into the Bill following the recommendation of the Goodenough Committee. There had been no objection from the university authorities, so far as his information went.

Mr. K. W. M. PICKTHORN supported Mr. Pitman's view that the universities were more than dubious about the proposal. What was left of the independence of the great teaching corporations should be preserved.

The amendment was withdrawn and the Clause agreed to. The remaining clauses, with two minor amendments, were also agreed to, and the Committee Stage concluded.

Report Stage

The concluding stages of the Bill were taken on July 21, when the Parliamentary Secretary to the Ministry of Health moved a number of new clauses, which were agreed, to meet points raised in the previous discussions.

On the subject of the G.M.C. disciplinary committee Sir HUGH LUCAS-TOOTH moved to insert a new paragraph

for securing that no matter other than a decision in a court of law shall be referred to the Committee unless a statement in writing of the essential facts of the matter has been made and signed by a responsible person.

He recalled the previous discussion on the proposal that a Government Department, before making a complaint to the Council, should institute some preliminary investigation and that the complaint should be fortified by a sworn statement by an officer of the Department. This amendment was more moderate, and required only that before a matter was referred to the Council for consideration it should be set down in writing and some responsible person should take responsibility for the statements on which the complaint was founded.

Mr. BEVAN replied with a statement of the present practice. There was an agreement with the G.M.C. in 1932, he said, after formal consultation with representatives of the Assurance Act Committee of the B.M.A. Particulars of disciplinary cases investigated by executive councils, or formerly insurance committees, were set before the G.M.C. when they related to (1) cases of irregular or lax certification, (2) cases of unprofessional conduct, (3) cases in which alleged canvassing or fraud was established or substantially supported, (4) since 1944, cases involving professional negligence. The documents sent to the G.M.C. were copies of a number of official papers, all either signed or, in the case of the reports of the Medical Service Committee, approved by persons or bodies. It was not practicable for the Department to endorse the facts therein stated which were not within the direct knowledge of the Department; before they could do that they would themselves have to investigate them, which would mean a pre-trial. If, however, the practitioner contested the facts, for instance in the report of the Medical Service Committee, his remedy was to appeal, and the report on the appeal would set out his case. The House would see that the facts were sent through approved machinery, and so no papers could be sent in containing merely tittle-tattle.

Sir H. LUCAS-TOOTH said the information which the Minister had given would be very valuable to all concerned, and withdrew his amendment.

On the Clause, previously debated, dealing with striking off the *Register*, Mr. BEVAN then proposed a series of amendments which in their final form as agreed made subsection (2) read:

In any inquiry under the said Section 29 whether a person has been guilty of infamous conduct in any professional respect any finding of fact which is shown to have been made in any matrimonial proceedings . . . in the High Court . . . shall be conclusive evidence of the fact found.

After some further discussion and minor amendments, the motion for the third reading was agreed to.

Sale of New Cars

In the debate on the Adjournment on July 12 Mr. G. THOMAS raised the matter of the resale of new cars, which was taking place daily at grossly inflated prices, while those who needed cars were waiting years for them. In the course of his speech he said that unhappily there were doctors who had exploited the privilege of their priority, getting three or four new cars and making a profit.

In his reply the Parliamentary Secretary to the Ministry of Supply said that the British Motor Trade Association had carried out a market research survey to see what was happening to new cars, and according to their figures not more than 2% were being resold within fifteen months of the signing of the covenant. At the moment the trade was only according a very limited priority to doctors and midwives, and was against any extension of the priority system. After much consideration the Minister had decided that final discretion on distribution was better left in the hands of local dealers than made the subject of a central control.

Health and Safety in the Mines

During the debate on the coal-mining industry and the work of the National Coal Board, in the House of Commons on July 13, Mr. C. F. GREY, formerly a coal hewer, drew attention to the fact that according to the Board's report for 1949 there were 22 more medical centres, bringing the total number up to 33, and 79 State-registered nurses—a new thing in industry. In the Northern Division there were 1,500 more certificated first-aid men.

Mr. H. J. FINCH mentioned that since the Industrial Injuries Act came into operation in July, 1948, men certified to be suffering from pneumoconiosis—provided it was not accompanied by tuberculosis—had been allowed to continue at work in the industry. Last year in South Wales, of 3,800 men so certified, 2,300 continued at work, most of them at the coal face.

River Pollution

The Minister of Health was questioned on July 11 by Mr. J. GRIMSTON about river pollution in several districts caused by untreated sewage or factory effluents.

Mr. BEVAN stated in reply that enforcement of the Rivers Pollution Prevention Acts was one of the statutory functions of the new river boards now being established. Pending the setting up of these boards responsibility rested with the local authorities or with the existing joint boards.

Tuberculosis Waiting-lists

Mr. D. LLEWELLYN asked the Minister of Health on July 19 how many tuberculous patients in Wales, Glamorgan, and Cardiff, respectively, were awaiting admission into sanatoria.

Mr. C. W. BLACK asked a similar question for the area of the South-west Metropolitan Regional Hospital Board.

Mr. ANEURIN BEVAN said that the total for Wales was 1,190, with Cardiff 111 and Glamorgan (excluding Cardiff) 536. In the specified Metropolitan area there were about 1,750 waiting, and this figure included 150 already in sanatoria but awaiting thoracic surgery. The average wait in this area was six to nine months.

Analgesia in Scotland

Mr. P. THORNEYCROFT asked the Secretary of State for Scotland on July 18 how many domiciliary confinements in the Glasgow area during 1949 were attended by midwives only; and in how many of such cases gas-and-air analgesia was administered. He also asked how many anaesthetic machines were available or on order on December 31, 1949.

Mr. HECTOR MCNEIL replied that in Glasgow 4,690 domiciliary confinements were attended by midwives alone during 1949, and in none of these was gas-and-air analgesia administered, since no machines were available or on order by the date specified. Since then, six machines had become available and 24 more were on order.

Sight Testing

Mr. JAMES JOHNSON asked the Minister of Health on July 20 how often a person may have his sight tested under the supplementary ophthalmic services.

MR. BEVAN said the answer was as often as necessary, but he was relying on ophthalmic medical practitioners and ophthalmic

opticians not to test a person's sight unless they felt that he really needed it and that different spectacles might be required.

Hospital Catering Staff.—According to a reply by the Minister of Health on July 13, senior catering staff increased from 7,885 on December 31, 1948, to 8,515 on the corresponding day of 1949.

Dental Students.—According to Mr. DOUGLAS JAY, the Financial Secretary to the Treasury, the intake of dental students in October, 1949, was 613. The Ministry of Education and Department of State for Scotland offered 209 new awards in dentistry in 1949. In that year the total number of students holding awards from those departments was 1,115.

Medico-Legal

RIGOR MORTIS

BY

H. A. SHAPIRO, M.D., Ph.D., F.R.S.S.Af.
Formerly Senior Lecturer in Medical Jurisprudence, University of Capetown, and Government Pathologist, Union Health Department, Capetown

Rigor mortis is generally defined as a stiffening of the muscles of the body which succeeds the stage of primary muscular flaccidity, and which develops at a variable interval after death. It is described as beginning in the muscles of the face, neck, and the lower jaw, and then spreading in a well-defined bilateral fashion from the upper part of the body to the four extremities, proceeding proximo-distally.[1]

Various time intervals have been described for the onset, rate of progression, and disappearance of rigor mortis. Because it is contended that rigor involves the temporo-mandibular joint before the shoulder-joint, and the latter before it involves the other joints of the upper and lower extremities, this sequence has usually been regarded as a valuable aid in determining the early post-mortem interval. The same remarks apply to the passing off of rigor. Although the actual mechanism involved in rigor mortis is not known, it is recognized that certain physical and chemical changes accompany its development in the muscles, leading to immobilization of the joints surrounded by the muscles involved. Two problems now arise.

1. It is difficult to understand why a physico-chemical process which takes place in recently dead tissues should follow the temporal and anatomical sequence usually described. It appears more likely that such a physico-chemical process will take place *simultaneously* in all the recently dead muscles.

2. The usual hypothesis certainly would not serve to explain the presence of rigor mortis in the joints of the fingers and toes, where there is no appreciable muscle mass to talk of, and where there are no muscles which appreciably determine flexion or extension of these digits.

I have often observed, in bodies which have not been disturbed and in which rigor mortis has developed to a sufficient degree to involve the wrists and the ankles, that, although there may be no more than about 5 to 10 degrees of movement at the elbow or the knee, there is a much greater degree of movement in flexion or extension at the shoulder or the hip. In other words, although the elbow is almost completely immobilized, the shoulder-joint is far from being so.

In addition, it is usually possible to demonstrate a considerable range of adduction, abduction, and circumduction in these large joints, as compared with the amount of movement in the elbow and the knee at this stage in the development of the rigor. I have not had an opportunity to determine the precise position in relation to the cervical vertebral joints, and hope that this present preliminary report may stimulate a reinvestigation of the whole problem on a scientific and quantitative basis.

A Simultaneous Change

If rigor mortis be regarded as a physico-chemical process occurring in all the recently dead muscles at the same time, then it would be reasonable to expect that small masses of muscle would be involved completely much more rapidly than large masses. Hence a relatively small joint (e.g., the temporo-mandibular or the elbow-joint), surrounded by a moderate amount of muscle, would become immobilized sooner than a large joint (e.g., the shoulder- or the hip-joint) surrounded by a relatively greater mass of muscle. This might explain the observation that fixity of the elbow- or the knee-joint occurs to a more advanced degree than that of the shoulder- or the hip-joint at the time of examination. This hypothesis would also explain in part why rigor is first seen in such a small joint as the temporo-mandibular joint.

As it is often found that an elbow-joint is immobilized to a greater extent than the shoulder-joint of the same limb—or the knee-joint as compared with the hip-joint—the account of the invariable progression of the rigor mortis sequence generally given in the textbooks may have to be modified. The explanation may have to be sought along the lines indicated above—namely, that rigor mortis does not progress from the upper end to the lower end of the body in a well-defined fashion, but occurs simultaneously in the recently dead muscles; and that the fixation of a joint depends, among other things, on the involvement by rigor mortis of the mass of muscle which controls that joint, thus immobilizing it. Variations in the sizes of different joints and in the muscle masses which control them determine the development of fixation and produce, on superficial study, an apparent proximo-distal progression of the rigor.

The movements of flexion and extension in the fingers and the toes are mainly determined by the movement of tendons in these parts, tendons predominantly dependent upon muscle masses anatomically located in the forearm. The digits are often seen in a marked degree of flexion when rigor mortis involves the elbow and the wrist. The marked flexion of the finger-joints, therefore, must be due to shortening of the muscles in the forearm and the wrist, and not due to any rigor in a non-existent muscle mass in the fingers themselves. It is unlikely that the interossei and the lumbricals are of any importance in this connexion. Further proof of the observation that there is no true rigor in the finger-joints themselves can be obtained by flexion or extension of a wrist-joint involved in rigor, when it will be seen that the corresponding appropriate flexions and extensions of the finger-joints will take place, although force applied directly to the fingertips does not produce any movement of the finger-joints. It seems that the development of rigor mortis in the fingers and the toes is dependent upon involvement of muscles at a distance from those members, and that there is no true rigor mortis of the finger- and toe-joints themselves.

It is well recognized that many variables affect the rate of onset, progression, and disappearance of rigor mortis. These have been very well summarized by Gordon.[2] It seems reasonable that a joint which can become immobilized fairly easily by a physico-chemical process because of the relatively small mass of muscle surrounding it—for example, the temporo-mandibular joint—may also be materially affected by such factors as a raised atmospheric temperature, a humid atmosphere, movement of air if the body is exposed in the open, etc. These and other variable factors will also affect the rigidity of the other joints of the body, but the effects may take longer to develop in joints less exposed to these factors.

If the hypothesis advanced to explain these observations is more in keeping with the facts observed, it is obvious that a still more limited reliance than is already the case at present must be placed upon data dependent upon the distribution of rigor mortis in a dead body for the purpose of estimating the early post-mortem interval.

[1] *Taylor's Principles and Practice of Medical Jurisprudence*, 1948, 10th ed., vol. 1, p. 192. London: Churchill.
[2] *Medical Jurisprudence*, 1945, 2nd ed. Capetown: Postgraduate Press and Stewart Printing Co. (Pty.), Ltd.

Universities and Colleges

UNIVERSITY OF OXFORD

In a Congregation held on June 22 the following degrees were conferred:

D.M.—J. E. French, R. G. Macbeth, Hon. Mrs. Margaret A. Jennings.

UNIVERSITY OF GLASGOW

On July 11 the D.P.H. was awarded to the following successful candidates: K. Campbell, Jean W. Cuthbert, Janet F. Graham, R. R. Houston, H. F. Jarvie, Teresa Kelly, A. Laurie, A. J. McKendrick, M. C. Macleod, I. P. F. Rae, J. A. W. Reid, Doreen R. C. Scorgie.

UNIVERSITY OF DUBLIN

SCHOOL OF PHYSIC, TRINITY COLLEGE

The following candidates have been approved at the examinations indicated:

M.D.—Muriel Bannister, L. A. Kerwood, J. R. Mahon, D. E. Mellon, J. H. Murphy, B. E. O'Brien.

M.CH.—D. S. Quill.

M.A.O.—M. T. S. Conradie, H. FitzGibbon, M. Ll. McCauley.

FINAL M.B.—[1]E. A. Martin, [1]A. T. F. ffrench-O'Carroll, [2]Helen P. Manning, [2]E. W. Lillie, [2]Helen M. Hackman, [2]R. A. L. Agnew, [2]D. A. A. Lane, [2]A. M. Cantor, [2]P. E. A. Blake Knox, [2]C. D. Levis, [2]Pauline M. Poole, [2]A. Rosenthal, [2]Sylvia Lath, [2]Mabel M. H. Hodgins, [2]J. A. N. Poynton, [2]Elinor D. U. Powell, [2] J. W. Lewis, [2]H. J. Neethling, J. O. Hunter, D. Romney, Margaret P. Wallace, P. A. H. Davis, K. K. O. Bentsi-Enchill, K. F. X. Bourke, Daphne A. F. Laughlin, Phyllis M. Lee, Grace M. F. Yorke, J. N. Cockrill, Anna I. Roberts, Renée A. Fleury, Doris B. Brownell, W. McC. Wilson, W. C. McCord, T. M. Bamford, G. Caplin, Jane C. Gatliff, Anna J. Hendly, F. J. McHugh, B. P. P. Judge, Hilary G. Orr, S. H. Buchalter, Anne L. J. Cusack, R. V. Lea, M. J. H. Hamilton, W. B. Seale, J. N. Adair, M. J. Sweeney, W. G. Hutchinson.

B.CH.—[1]Margaret P. Wallace, [1]E. A. Martin, [2]C. D. Levis, [2]Doris B. Brownell, [2]Helen P. Manning, [2]D. A. A. Lane, [2]Grace M. F. Yorke, A. M. Cantor, Reva Berstock, W. C. McCord. Mildred Vilensky, T. M. Bamford, K. C. Finkel, K. F. X. Bourke, T. H. Bewley, Pauline M. Poole, J. W. Lewis, Anna I. Roberts, P. A. H. Davis, Hilary G. Orr, A. C. Allen, J. A. N. Poynton, Elinor D. U. Powell, Anne L. J. Cusack, Annie M. G. Troughton, Jane C. Gatliff, W. B. Seale, A. A. Sweeney, S. H. Buchalter, G. Caplin, H. A. Devlin, Phyllis M. Lee, F. J. McHugh, R. A. L. Agnew, M. J. H. Hamilton, D. Miller, N. Furlong, Renée A. Fleury, Sylvia Lath, J. N. Adair, H. Parsons, R. V. Lea, H. J. Neethling, V. P. O'Sullivan Quinn, Germaine H. Ross, K. K. O. Bentsi-Enchill, J. C. McLean, N. R. McNutt, R. Nelson.

D.G.O.—I. D. Miller.

[1]With first-class honours. [2]With second-class honours.

UNIVERSITY OF LONDON

The following candidates have been approved at the examinations indicated:

ACADEMIC POSTGRADUATE DIPLOMA IN MEDICAL RADIOLOGY.—*Diagnosis:* W. E. Craddock, Joan M. T. MacCarthy, W. Smith, W. R. R. Thursfield, C. D. Wilson-Sharp. *Therapy:* E. W. Emery, Frances A. Fouracres, B. Strickland.

Dr. E. R. Boland has been elected Dean of the Faculty of Medicine for the period 1950–2.

The title of Professor Emeritus of Surgery in the University has been conferred on Professor C. A. Pannett on his retirement from the Chair of Surgery at St. Mary's Hospital Medical School which he has held since 1922.

The title of Professor Emeritus of Obstetrics and Gynaecology in the University has been conferred on Professor James Young on his retirement from the Chair of Obstetrics and Gynaecology at the Postgraduate Medical School of London which he has held since 1934.

The title of Professor Emeritus in Psychology in the University has been conferred on Sir Cyril Burt on his retirement from the Chair of Psychology at University College which he has held since 1931.

UNIVERSITY OF BIRMINGHAM

Robert Schneider, M.D., M.R.C.P., has been appointed Lecturer in Experimental Therapeutics in the Department of Pharmacology from August 1.

The following have been appointed University Clinical Lecturers in the subjects indicated in parentheses: A. L. Deacon, F.R.C.S.Ed., M.R.C.O.G. (Obstetrics and Gynaecology); G. M. Holme, M.B., Ch.B. (Radiology); C. W. Taylor, M.B., Ch.B. (Clinical Pathology); A. C. Crook, M.D. (Endocrinology); M. Sim, M.D., and R. W. Tibbetts, D.M. (Psychiatry); Margaret L. A. Galbraith, M.B., Ch.B., Helen Scott Mason, M.B., Ch.B., Margaret J. Mills, M.B., Ch.B., Doris J. Wall, M.B., Ch.B., Janet R. Welsh, M.R.C.S., L.R.C.P., and Helen M. Wood, M.B., Ch.B. (Anaesthetics).

At a Congregation on July 1 the following medical degrees were conferred:

M.D.—R. G. Record (with honours), C. R. Lowe, A. G. W. Whitfield.

CH.M.—C. P. Nicholas.

PH.D.—C. N. Iland, M.B., Ch.B., D.C.P.

M.B., CH.B.—*Pamela M. Moody, *G. W. Thorpe, *J. A. Williams, Dorothy S. Alabaster, Patricia J. Barnes, J. D. Baston, Pamela Beal, Betty N. Brain, Mary Cooksey, H. G. Cooper, C. Dexter, A. F. Dukes, Cathleen M. Elliott, N. W. J. England, M. J. Everton, Amy M. Fawcett, D. F. Ferrington, J. Fredoun, Daphne M. Hampton, P. F. Harris, R. S. Harris, A. R. Harrison, R. J. Hetherington, J. S. Howell, J. P. Lavender, Gwladys N. McCoach, J. M. Park, J. W. Parkin, J. R. Pearson, B. W. Petty, F. L. Richardson, Nancy G. S. Roberts, W. R. Roberts, G. J. R. Soutter, J. M. A. C. Stewart, H. J. S. Waldeck, J. M. Walker, W. L. Whitehouse, W. E. S. Whittingham, Rosalinde J. Hampton (in absentia).

*With second-class honours.

UNIVERSITY OF LEEDS

At a meeting of the Council on Wednesday, July 19, 1950, Mr. A. F. Maloney, B.Sc., M.B., Ch.B., was appointed to the newly instituted post of Lecturer in Neuropathology. The following appointments were also made: B. W. Wyke, M.B., B.S., Lecturer in Physiology, and R. N. Tattersall, O.B.E., M.D., as Clinical Lecturer in Medicine. The Council granted the necessary leave of absence to Dr. R. G. Paley, Research Assistant in the Department of Medicine, to enable him to take up a Nuffield Scholarship which has been awarded to him for work in the United States of America.

QUEEN'S UNIVERSITY, BELFAST

The following candidates have been approved at the examinations indicated:

M.D.—N. J. Ainley, S. J. G. Gilmour, S. G. McComb, [1]H. B. McDowell, [1]Mary G. McGeown, [2]W. H. Shepherd, D. G. Simpson, [2]D. W. Wallace, C. G. Warnock (gold medal), R. J. Young.

M.B., B.CH., B.A.O.—W. D. Addis, Vivien R. Boyd, P. G. Buckham, J. Burrowes, H. L. Courtenay, W. J. Crawford, R. H. Currie, Irene G. Douglas, J. Dunlop, Margaret R. Elder, R. M. Ellis, Jean M. Fitzsimons, Patricia Gorman, Elizabeth Hawkins, T. L. Hazelton, W. C. Heron, M. McA. Holmes, Elizabeth L. Houston, Monica Kerrigan, W. J. Love, Martha E. McCormack, J. G. McKenny, Sheila C. McNally, J. B. McSherry, Maureen E. Magowan, D. C. S. Millar, D. G. Rice, Dorothy E. Robb, Beatrice A. Russell (with second-class honours), J. Smyth, J. E. L. Sutcliffe.

[1]With high commendation. [2]With commendation.

ROYAL COLLEGE OF PHYSICIANS OF EDINBURGH

At a quarterly meeting of the Royal College of Physicians of Edinburgh held on July 18 with the vice-president, Dr. W. A. Alexander, in the chair, the following were elected Fellows of the College: K. K. V. Rao, R. L. Langley, E. L. Thomson.

The following were elected Members of the College: J. Gillies, J. B. Gaylor, G. I. H. Braine, Z. Godlowski, R. P. Leake, D. R. Huggins, L. Crome, J. S. Meredith, A. T. M. Myres, B. E. H. Koch, R. W. B. Scutt, Betty E. A. Magill, R. J. Cuthbert, Nan Wan Low, Dina N. Banerjee, R. L. Amoils, R. A. Burston, J. McC. Murdoch, E. V. C. Dawson, R. C. W. Lowe, A. D. Muir, L. S. Smith, R. W. Morris, Mary Patten, I. Cohen.

ROYAL COLLEGE OF SURGEONS OF EDINBURGH

At a meeting of the Royal College of Surgeons of Edinburgh held on July 19, with Mr. W. Quarry Wood, president, in the chair, the following who have passed the requisite examinations were admitted Fellows: S. O. Awoliyi, A. S. Badger, A. N. Cameron, L. Ganz, S. P. Jain, F. R. C. Johnstone, N. R. Mackay, K. G. Malcomson, J. R. Moffat, R. F. Mulligan, J. G. Murray, K. K. Murthy, J. A. O'Garra, E. H. Rees, W. A. T. Robb, D. I. Roberts, K. Rostron, E. Sarfati, J. H. S. Scott, H. Singh, J. J. W. van Zyl, S. P. Wanchoo, I. B. Watson, R. B. C. Welsh.

No. 27

INFECTIOUS DISEASES AND VITAL STATISTICS

We print below a summary of Infectious Diseases and Vital Statistics in the British Isles during the week ended July 8.

Figures of Principal Notifiable Diseases for the week and those for the corresponding week last year, for: (a) England and Wales (London included). (b) London (administrative county). (c) Scotland. (d) Eire. (e) Northern Ireland.
Figures of Births and Deaths, and of Deaths recorded under each infectious disease, are for: (a) The 126 great towns in England and Wales (including London). (b) London (administrative county). (c) The 16 principal towns in Scotland. (d) The 13 principal towns in Eire. (e) The 10 principal towns in Northern Ireland.
A dash — denotes no cases; a blank space denotes disease not notifiable or no return available.

Disease	1950 (a)	(b)	(c)	(d)	(e)	1949 (Corresponding Week) (a)	(b)	(c)	(d)	(e)
Meningococcal infection	34	2	19	2	2	23	3	15	3	
Deaths		1	—				—	1		
Diphtheria	63	3	9	3	1	80	14	37	—	13
Deaths	1	—	—	—	—	—	—	—	1	—
Dysentery	278	12	87	—	—	49	3	61	—	
Deaths					—				—	—
Encephalitis, acute	6	—	—		—	—	—	—	—	
Deaths		—		—			—			
Erysipelas			17	2	4			14	9	2
Deaths							—			
Infective enteritis or diarrhoea under 2 years				23					55	
Deaths	13		2	4	—	22	3	4	2	—
Measles*	8,955	649	394	219	165	6,984	714	180	276	137
Deaths†		1	—	—	—				1	
Ophthalmia neonatorum	45	3	10	—	—	50	—	14	1	1
Deaths										
Paratyphoid fever	15	2	—	—	—	13	—	—	—	
Deaths	—		—		—	—	—	—	—	—
Pneumonia, influenzal	281	13	2	—	3	376	19	5	1	8
Deaths (from influenza)‡	1	—	—	2	—	6	—	2	—	—
Pneumonia, primary			115	¶				169	38	
Deaths	107	16		3	4	135	15		11	3
Poliomyelitis, acute	212	22	42	3	10	81	6	2	2	—
Deaths§	14	1		1		4	2			
Puerperal fever		—	10				—	10		
Deaths										
Puerperal pyrexia‖	73	4	1	—	2	101	11	13	—	—
Deaths							—			
Relapsing fever	—	—			—	—	—			—
Deaths										
Scarlet fever	1,031	47	118	67	70	1,031	96	146	59	29
Deaths†			—	—	—			—	—	—
Smallpox	—	—	—		—	—	—	—	—	—
Deaths					—				—	
Typhoid fever	2	—	—	5	—	4	2	—	2	1
Deaths	—	—	—		—	—	—	—	—	
Typhus fever	—	—	—	—	—	—	—	—	—	—
Deaths					—				—	
Whooping-cough	3,934	233	281	85	44	2,260	110	52	89	74
Deaths	4	—	—	—	—	6	—	1	—	1
Deaths (0–1 year)	191	33	25	10	9	251	37	32	19	11
Deaths (excluding stillbirths)	3,934	593	527	141	102	4,192	707	555	168	106
Annual death rate (per 1,000 persons living)			10·6					11·1	10·4	
Live births	7,131	1177	950	409	206	7,618	1212	891	446	257
Annual rate per 1,000 persons living			19·1					17·9	27·6	
Stillbirths	203	27	20			181	18	22		
Rate per 1,000 total births (including stillborn)			21					24		

* Measles is not notifiable in Scotland, and the returns are therefore an approximation only.
† Deaths from measles and scarlet fever for England and Wales, London (administrative county), will no longer be published.
‡ Includes primary form for England and Wales, London (administrative county), and Northern Ireland.
§ The number of deaths from poliomyelitis and polio-encephalitis for England and Wales, London (administrative county), are combined.
‖ Includes puerperal fever for England and Wales and Eire.
¶ Primary pneumonia no longer notifiable in Eire.

EPIDEMIOLOGICAL NOTES

Poliomyelitis

Notifications of poliomyelitis in the week ended July 15 were: paralytic cases 152 (139); non-paralytic 60 (73), giving a total of 212 (212). The figures for the previous week are shown in parentheses. With identical total figures for the two weeks there was an increase of 13 in the paralytic cases, offset by a reduction of the same size in the non-paralytic cases.

In the week under review there was no evidence of any material tendency for the disease to spread. It is still most prevalent in Warwickshire, but notifications there are on the decline, as shown by the following figures.

	Paralytic	Non-paralytic	Total
For week ending—June 24	43	2	45
July 1	39	8	47
July 8	37	4	41
July 15	32	6	38

In Lancashire there was a small increase from the preceding week to 18 paralytic cases in the week under review. In Worcestershire there was a material fall from 16 paralytic and 6 non-paralytic cases to 10 paralytic and 1 non-paralytic case. In London, too, there was a decided fall from 15 to 4 for paralytic cases and from 7 to 4 for non-paralytic cases.

Discussion of Table

In *England and Wales* there were increases in the notifications of acute poliomyelitis 52, measles 37, diphtheria 17, and dysentery 16. There were decreases in the incidence of scarlet fever 54 and acute pneumonia 54.

The decrease in the incidence of scarlet fever was due to the experience of the southern section of the country; in London and the south-eastern counties 76 fewer cases were notified than in the preceding week, while a small rise occurred in the north.

The chief features of the returns for diphtheria were increases in Cheshire 5, Durham 5, Lancashire 4, and Warwickshire 4. The largest of the local returns for diphtheria were Birmingham C.B. 8, Birkenhead C.B. 6, and Liverpool C.B. 6.

The largest decreases in the notifications of measles were Yorkshire West Riding 154, Lancashire 100, Warwickshire 88, and Northumberland 82; the largest increases were Gloucestershire 191, Nottinghamshire 76, and Hertfordshire 61. The largest variations in the returns for whooping-cough were rises in the notifications in Durham 57 and Lancashire 43, with falls in Middlesex 68 and Yorkshire West Riding 43.

The chief features of the returns of dysentery were a decrease of 35 in Yorkshire West Riding and an increase of 80 in Lancashire. The largest returns were Lancashire 138 (Accrington M.B. 39, Preston C.B. 29, Blackburn C.B. 27, Oldham C.B. 17); Yorkshire West Riding 39 (Bradford C.B. 13, Dewsbury C.B. 8); London 12; Nottinghamshire 10 (Nottingham C.B. 8); and Durham 10.

The chief variations in the notifications of acute poliomyelitis were increases in Worcestershire 11, London 9, and Essex 7, with decreases in Warwickshire 6 and Staffordshire 5. The largest returns during the week were Warwickshire 41 (Birmingham C.B. 34); Worcestershire 22 (Dudley C.B. 5, Halesowen M.B. 6, Oldbury M.B. 4); London 22 (Greenwich 8, Woolwich 6); Lancashire 17 (Liverpool C.B. 8, Manchester C.B. 4); Staffordshire 13, Essex 10; Carmarthenshire 10 (Llandilo R.D. 5, Ammanford U.D. 4); Northumberland 9 (Newcastle-upon-Tyne C.B. 4); Yorkshire West Riding 7; and Kent 7.

In *Scotland* infectious diseases were slightly less prevalent during the week. There were decreases in the notifications of dysentery 26, scarlet fever 13, and measles 11. Despite the large fall in the notifications of dysentery the disease was a little more widespread, and 15 localities reported a case compared with 13 in the preceding week. The largest returns for dysentery were Glasgow 42 and Edinburgh 16. The largest returns of acute poliomyelitis came from Glasgow 17 (10 fewer than in the preceding week), Fife county 4, Lanark county 4, and Renfrew county 4.

In *Eire* there were decreases in the notifications of measles 72 and whooping-cough 10. The fall in the incidence of measles

was mainly due to Dublin C.B., where the notifications were 64 fewer than in the preceding week. Only 7 cases of diarrhoea and enteritis were notified in Dublin C.B., a decrease of 14, but a slight rise was noted in other areas.

In *Northern Ireland* increases were recorded for measles 59 and scarlet fever 13. The rise in the incidence of measles occurred in County Down, where 99 cases, an increase of 72, were notified. Increases were also reported in this county for scarlet fever 9 and whooping-cough 11.

Week ending July 15

Notifications of infectious diseases in England and Wales during the week included: scarlet fever 1,175, whooping-cough 4,117, diphtheria 50, measles 9,295, acute pneumonia 315, acute poliomyelitis 212, dysentery 222, paratyphoid fever 9, and typhoid fever 3.

Medical News

Royal Medical Benevolent Fund

The annual general meeting of the Royal Medical Benevolent Fund was held on July 11. Lord Webb-Johnson was re-elected president, Dr. C. Luther Batteson honorary treasurer, and Mr. Victor Riddell honorary secretary. The honorary treasurer's report for the year 1949 showed that the committee had been able to distribute in charitable gifts £4,857 more than in any previous year, the total distribution being £37,202.

P.R.C.O.G.

Professor Hilda Lloyd, professor of obstetrics and gynaecology at Birmingham University, was re-elected President of the Royal College of Obstetricians and Gynaecologists on July 22. She first became President a year ago in succession to Sir William Gilliatt.

Hon. F.F.R.

On the occasion of the Sixth International Congress of Radiology the Faculty of Radiologists on July 25 conferred its Honorary Fellowship on the following: Professor G. Forssell, Sweden; Professor H. R. Schinz, Switzerland; Dr. A. C. Christie, U.S.A.; Dr. George Pfahler, U.S.A.; Professor W. A. Jones, Canada; Professor A. T. Nisbet, Australia; Professor S. F. Oosthuizen, South Africa; and Sir Stanford Cade, Great Britain.

Film on the Lymphatics

At the meeting of the Section of Anatomy and Physiology on July 19, during the Annual Meeting of the British Medical Association at Liverpool, Professor J. M. Yoffey showed a colour film entitled "The Lymphatics." This was a teaching film with a spoken commentary made with the assistance of the I.C.I. film unit. After a brief historical introduction the film demonstrated the essentials of lymph formation and typical lymphatic pathways in anaesthetized animals. In the latter sequences the excellent dissections were backed up by unusually clear photography. A particularly good demonstration was that of the path of the dye after a suspension had been instilled into the nose. Animation sequences were used to drive home lessons which could not be taught by dissections—for instance, the life history of the lymphocyte (so far as it is known). This film, which is a model of its kind, illustrates what a valuable aid cinematography is to teaching, for the many dissections photographed must have taken hours to prepare.

Reciprocal Arrangements with the Channel Islands

A reciprocal health service agreement has been concluded between the Ministry of Health and the Department of Health for Scotland on the one hand and the States of Jersey and Guernsey on the other. Under the agreement Channel Islanders may use the facilities of the National Health Service (other than those relating to mental health and mental deficiency) free of charge, and arrangements will be made for the admission of Channel Islanders to hospitals in Britain where adequate hospital facilities do not exist in Jersey or Guernsey. The range of facilities available in the Channel Isles, and the absence of a free national health service there, has made it impossible to secure a complete range of health service facilities for visitors from Britain. Account has also had to be taken of the very large number of British tourists visiting the Channel Islands each summer. Jersey will therefore provide free hospital treatment, both in-patient and out-patient, but no family-doctor service. Guernsey will provide free hospital in-patient treatment and a family-doctor service. No dental or ophthalmic treatment is to be provided by the States of either island. All free facilities provided by the States are for tourists from Great Britain only, and not for those who become resident in the islands. The States are to pay the Ministry of Health for certain accommodation in mental deficiency institutions in England and for some laboratory facilities.

Blind in Scotland

The Department of Health for Scotland states that the number of blind children in Scotland is decreasing, although more adults were registered as blind last year than ever before. Over three-quarters of all blind persons are now over 50 years old. There were 8,854 blind persons at the end of March of this year, compared with 8,596 in 1949 and 9,084 (the highest recorded figure) in 1939. The highest recorded figure of 1,060 persons were registered as blind during the year; 909 of these were persons aged 50 and over; 27 were children under 16. Blindness among children continues to decrease; there were 170 blind children under 16 years of age compared with 195 in 1939. As blindness is largely an affliction of old age, it is to be expected that the proportion of blind people in the upper age groups will tend to increase with the ageing of the population; 70% of all registered blind persons are now 50 years of age and over as compared with 72% in 1939.

Alfred Hospital Clinical Reports

The Alfred Hospital, Melbourne, Australia, has issued the first number of the *Alfred Hospital Clinical Reports*, a periodical that is to appear annually. The reports will record some of the work done at the Alfred Hospital, including papers that have already been published elsewhere as well as new material. The first number contains a variety of papers from members of the hospital staff, and one from Professor R. A. Willis in which he pleads "for the avoidance of cancer research in watertight compartments."

Leeds Golf

In the Leeds Medical Golf Competition, which was held on July 9, Mr. L. L. Hurwich, of Bradford, won the Moynihan Challenge Cup, beating Dr. John Douglas 5 and 4 over 36 holes.

Wills

Professor Frederick William Twort, of Camberley, Surrey, left £4,391. Dr. Charles Montague Chadwick, of Tunbridge Wells, left £102,273; Dr. Edmund Towers Fison, of Salisbury, £64,822; Dr. John Graham Standing, of Dalston, Cumberland, £64,428; Dr. Robert Ashton Jackson, of Chadderton, Lancs, £40,882; Dr. Harry Carlile Sturdy, of Bognor Regis, Sussex, £37,869; Dr. Frederick William Poole, of Bristol, £37,672; Dr. Eliot Curwen, of Hove, £36,405; Dr. Percy Collins Litchfield, of Purley, Surrey, £24,363; Dr. Owen Fenner Joynson, of Padiham, Lancs, £21,895; Dr. Robert Stephen Charsley, of Slough, £15,712.

Dr. John Orr, of Edinburgh, left £36,708; Dr. Lancelot Gerard Bourdillon left £17,004; Professor Samuel Ernest Whitnall, formerly of Bristol, £13,565; and Dr. Henry Adamson Hirst, formerly of Southampton, £1,169.

Dr. Thomas Brice Poole, of Hove, left £43,669; among other bequests he left £500 to the Royal Medical Benevolent Fund and £250 to the Royal Medical Foundation, Epsom College. Dr. Sidney Vere Pearson, of Mundesley-on-Sea, Norfolk, left £42,292; Dr. Lionel Alfred Dingley, of Myddle, Shropshire, £50,075; and Dr. Arthur Crofts de Beetham Helme, of Woking. £10,225.

COMING EVENTS

Hospitals in Sweden

The International Hospital Federation is organizing a study tour for its members to visit Sweden on September 3–13. Information may be obtained from the Federation at King Edward's Hospital Fund for London, 10, Old Jewry, London, E.C.2.

International Society of Angiology

The first meeting of the recently founded International Society of Angiology will be held in Paris on September 4–5 at the Collège de France, Place Berthelot. The officers of this society are: Dr. René Leriche (Paris), president; Drs. Emile Holman (San Francisco), Alexander M. Boyd (Manchester), and Fernando Martorell (Barcelona), vice-presidents; Dr. Henry Haimovici (New York), secretary. All correspondence about the society and its first meeting should be addressed to Dr. Henry Haimovici, 1148, Fifth Avenue, New York 28, N.Y.

Criminology

The second International Congress on Criminology will be held in Paris on September 10–19, 1950. The deliberations of the congress are to be concentrated on two main questions: first, what has been discovered in criminology during the past 20 years; secondly, what are the methods of research followed in the different sciences that go to make up the discipline of criminology and what results these different methods have achieved. The United Kingdom representatives are Dr. Denis Carroll and Dr. Hermann Mannheim. Those who might be able to attend the congress or who want further information about it should write to the organizing secretary in the United Kingdom, Second International Congress on Criminology, c/o the Institute for the Scientific Treatment of Delinquency, 8, Bourdon Street, London, W.1.

French Congress of Medicine

The First International Congress of Internal Medicine will be held in Paris on September 11–14. Full particulars may be obtained from the Secrétariat du Congrès International de Médecine Interne, 38, rue Barbet-de-Jouy, Paris, 7.

The Venous System

The Medical Societies of Marseilles and Aix-en-Provence, under the auspices of the Marseilles Medical Faculty and with the patronage of Professor Laubry, president of the First World Congress of Cardiology, are organizing at Aix-en-Provence, after the World Congress, an International Meeting on the Venous System, to be held on September 15–17. Inquiries should be addressed to Doctor Beurier, 4, Cours Mirabeau, Aix-en-Provence, France.

Chest Diseases

The First International Congress on Diseases of the Chest will be held at the Carlo Forlanini Institute, Rome, Italy, on September 17–20, under the auspices of the Council on International Affairs of the American College of Chest Physicians and the Carlo Forlanini Institute, in collaboration with the Italian National Institute of Health and the Italian Federation against Tuberculosis. Physicians interested in attending the congress should communicate as soon as possible with Dr. Chevalier L. Jackson, chairman of the Council on International Affairs, American College of Chest Physicians, 500, North Dearborn Street, Chicago 10, Illinois, U.S.A., or with Professor A. Omodei Zorini, Carlo Forlanini Institute, Rome, Italy.

SOCIETIES AND LECTURES

A fee is charged or a ticket is required for attending lectures marked ●. Application should be made first to the institution concerned.

Monday

EDINBURGH POSTGRADUATE BOARD FOR MEDICINE.—At University New Buildings (Anatomy Lecture Theatre), Edinburgh, July 31, 3.30 p.m., "*Poliomyelitis and Poliomyelitis-like Illnesses*," by Dr. A. J. Rhodes (Toronto).

APPOINTMENTS

THE HOSPITAL FOR SICK CHILDREN, Great Ormond Street, London, W.C.1.—*Two House-physicians (Junior Registrar Grade)*, J. G. Millichap, M.B., B.S., M.R.C.P., D.C.H., and J. N. Montgomery, M.B., B.Ch., M.R.C.P., D.C.H.; *Two House-surgeons (Junior Registrar Grade)*, J. P. Hopewell, F.R.C.S., and R. T. Routledge, M.B., B.S.; *Resident Anaesthetic Registrar (Registrar Grade)*, Miss M. E. Browne, M.B., Ch.B.; *Junior Resident Anaesthetic Registrar (Junior Registrar)*, Miss M. L. M. Bridges, M.B., B.S.; *Two Assistant Medical Registrars (Registrar Grade)*, A. D. M. Jackson, M.D., M.B., B.S., M.R.C.P., D.C.H., and P. R. Swyer, M.B., B.Ch., M.R.C.P., D.C.H.; *Part-time Registrar to the Department of Psychological Medicine (Registrar Grade)*, Mrs. L. M. Brierley, M.B., Ch.B., D.C.H.; *Resident Assistant Physician (Senior Registrar Grade)*, J. L. Greaves, M.D., M.R.C.P.; *Part-time Registrar to the Dental Department (Senior Registrar Grade)*, F. E. N. Preston, L.D.S. R.C.S.

SOUTH-WESTERN REGIONAL HOSPITAL BOARD.—*Consultant Radiologist in Bristol Clinical Area*, G. R. Airth, M.B., B.S., D.M.R.(D); *Consultant Chest Physician in Bristol Clinical Area*, A. T. M. Roberts, M.R.C.S., L.R.C.P., M.B., B.S., M.R.C.P., M.D.; *Two Consultant Psychiatrists to Barrow and Fishponds Hospitals*, D. F. Early, L.R.C.P. and S.I., L.M., D.P.H. (N.U.I.), D.P.M. (R.C.S.I.), and A. Leitch, M.B., Ch.B., D.P.M., M.D.; *Consultant Anaesthetist in North Gloucestershire Clinical Area*, B. R. Little, M.R.C.S., L.R.C.P., D.A. (R.C.P. and S.); *Consultant Physician in Bath Clinical Area*, D. W. Pugh, M.R.C.S., L.R.C.P., M.B., B.S., M.R.C.P., M.D.; *Consultant Radiologist in Bath Clinical Area*, A. C. P. D. Thomson, M.B., Ch.B., D.M.R.; *Consultant Obstetrician and Gynaecologist in Bath Clinical Area*, B. E. Blair, M.R.C.S., L.R.C.P., M.B., B.S., M.R.C.O.G., F.R.C.S.; *Consultant Surgeon in Bath Clinical Area*, C. P. Sames, M.S., F.R.C.S., M.B., B.S., M.R.C.S., L.R.C.P.; *Consultant Surgeon in Exeter Clinical Area*, K. P. S. Caldwell, M.R.C.S., L.R.C.P., M.B., B.Ch., F.R.C.S.; *Consultant Dermatologist in Plymouth Clinical Area*, R. D. Sweet, M.B., B.Chir., M.R.C.P.; *Consultant Psychiatrist in Plymouth Clinical Area*, R. A. Blair, M.R.C.S., L.R.C.P. (R.C.P. and S.), M.B., B.S., M.D., D.P.M. (R.C.P. and S.); *Consultant Orthopaedic Surgeon in West Cornwall Clinical Area*, R. N. Grant, M.R.C.S., L.R.C.P., F.R.C.S.; *Consultant Anaesthetist in West Cornwall Clinical Area*, J. K. Lewis, M.B., Ch.B., D.A.; *Consultant Obstetrician and Gynaecologist in West Cornwall Clinical Area*, P. N. Simons, M.B., B.S., D.Obst.R.C.O.G., M.R.C.O.G., F.R.C.S.; *Consultant Physician in West Cornwall Clinical Area*, W. H. St. John-Brooks, M.R.C.S., L.R.C.P., M.B., B.Ch., M.R.C.P.; *Two Physicians in Psychiatry at Bristol Mental Hospital*, R. Maggs, M.B., Ch.B., D.P.M., and S. Smith, M.B., Ch.B., M.D., M.R.C.P.; *Deputy Medical Superintendent at Hortham-Brentry Colony*, W. A. Heaton-Ward, M.B., Ch.B., D.P.M.; *Deputy Medical Superintendent at Sandhill Park Institution*, T. Parr, M.B., Ch.B., D.P.M., M.D.; *Medical Officer at Tone Vale Hospital*, F. R. M. Calder, M.A., M.B., Ch.B., D.P.M.

MILLAR, ERNEST LESLIE MORGAN, M.D., M.Sc., D.P.H., Deputy Medical Officer of Health, Birmingham.

BIRTHS, MARRIAGES, AND DEATHS

BIRTH

Caspers.—On July 12, 1950, at the Querns Maternity Home, Cirencester, Gloucestershire, to Nancy (formerly Bennett), wife of Dr. Anthony Caspers, R.A.F., a daughter—Jane Elisabeth de Meysey.

MARRIAGES

Freeland—Evans.—On July 15, 1950, at Ilford, Derek E. Freeland, B.M., to Patricia Evans.

Thomas—Rees.—On July 15, 1950, at Llwyncelyn, Aberykon, South Wales, D. Gareth Hughes Thomas, M.B., B.Ch., to Aisla Rees, B.A.

DEATHS

Barnett.—On July 14, 1950, at Dunedin, New Zealand, Geoffrey Michael Fulton Barnett, F.R.C.S.

Court.—On July 22, 1950, at The Ridge, Ilminster, Somerset, Christopher Charles Cole Court, M.B., Ch.B., D.P.H.

Dodgson.—On July 15, 1950, at 1, Adur Avenue, Shoreham-by-Sea, Sussex, Henry Dodgson, T.D., M.B., Ch.B., aged 76.

Edmonston.—On July 20, 1950, at Cheltenham, Charles Gordon Edmonston, M.B., F.R.C.S.Ed.

Hoile.—On July 15, 1950, at 145, High Street, Montrose, Henry John Hoile, M.B., Ch.B.

Mitchell.—On July 21, 1950, Marjorie Hall Mitchell, M.B., Ch.B., D.P.H., of Umtata, 34, Corrour Road, Newlands, Glasgow.

Pirie.—On July 17, 1950, at Deaconess Hospital, Edinburgh, Anna Margaret Pirie, M.B. Ch.B., of Bermondsey Medical Mission Hospital, London.

Price.—On July 24, 1950, Ivor Price, F.R.C.S., of St. Mary Islington Hospital, Highgate Hill, N.

Ray.—On July 5, 1950, in London, Matthew Burrow Ray, D.S.O., O.B.E., T.D., M.D., M.R.C.P., Colonel, late T.A.

Rishworth.—On July 6, 1950, at 3, Lee Terrace, Blackheath, London, S.E., James Maule Rishworth, M.B., B.Ch., D.P.H., aged 64.

Rust.—On June 26, 1950, at 65, Albenor, Sea Point, Capetown, Montague Rust, L.R.C.P.&S.Ed. L.R.F.P.S.Glas., late of Newport, Fife, aged 76.

Sandeman.—On July 6, 1950, at Jura, Argyll, Charles Stewart Sandeman, M.B., Ch.E., Major, R.A.M.C., retired.

Sedgwick.—On July 6, 1950, at Combe House, Tetbury, Glos, Richard Ernest Sedgwick, M.D.

Smith.—On July 11, 1950, at Longmeadow, Park Mill, Swansea, Henry Faithful Smith, M.D., late of Windermere, Westmorland.

Stevenson.—On July 14, 1950, at 90, Chesterton Road, Cambridge, Claude Maberly Stevenson, M.D.

Tilley.—On July 11, 1950, James Leonard Octavius Tilley, M.R.C.S., L.R.C.P., L.D.S., late of 11, Bentinck Street, London, W., and of Somerset.

Vincent.—On July 11, 1950, at Sevenoaks, Kent, Clive Rowland Bishop Vincent, M.R.C.S., L.R.C.P., aged 28.

Ward.—On July 4, 1950, at "Kirkham," Babbacombe, Torquay, Horace Smith Ward, O.B.E., T.D., M.R.C.S., L.R.C.P., Colonel, T.A., late R.A.M.C., retired, aged 54.

Wilson.—On July 6, 1950, at Redhurst, Irvine, Ayrshire, James Wilson, M.D., D.P.H.

Williams.—On July 17, 1950, John Cadwaladr Williams, M.B., C.M., of Cerrig-y-Druidion and Betws Garmon, late of London.

Williams.—On July 23, 1950, Hugh Lloyd Williams, M.R.C.S., L.D.S., J.P., of Waenfawr, Caernarvonshire, late of 128, Harley Street, London, W.

Any Questions?

Correspondents should give their names and addresses (not for publication) and include all relevant details in their questions, which should be typed. We publish here a selection of those questions and answers which seem to be of general interest.

Treatment of Trachoma

Q.—(*a*) *I have recently read reports of the successful treatment of trachoma with aureomycin or chloromycetin, but no details of the course required were given. What is the recommended dosage?* (*b*) *What is the most recent treatment for trachoma with sulphonamides or any other drug? What dosages are given, and what sort of response is obtained?*

A.—No substantial series of cases of trachoma treated with aureomycin or chloromycetin has been published as yet. Treatment with these agents is still in the experimental stage, so that neither the dosage nor the relative value—or indeed the efficacy—of these agents can be indicated. For the present it is probably best to rely on sulphonamide therapy. However, an account of a small series of cases treated with aureomycin is given by S. Duke-Elder, D. Ainslie, and A. J. Boase in the *British Journal of Ophthalmology*, 1950, **34**, 30. In the eight cases of trachoma treated by one drop of aureomycin at three-hourly or four-hourly intervals for ten days good results were seen. Although this series is much too small to warrant a final conclusion, the therapeutic results are such that the authors express the opinion "that aureomycin will cure the disease in an incredibly short time." The optimum dosage and mode of administration are not yet settled, but certainly in these cases satisfactory results seemed to follow the simple and economical routine of one drop at four-hourly intervals. The response did not seem to be more rapid in two patients treated with three-hourly drops.

As for sulphonamide therapy, the following procedure is advocated by A. Sorsby (*Brit. J. Ophthal.*, 1945, **29**, 98). (1) If secondary infection is present this should first be eliminated by the oral administration of a sulphonamide. Sulphamezathine in an initial dose of 2 g. for an adult with a maintenance dose of 1 g. at six-hourly intervals may be used for about seven days. If sulphamerazine is prescribed the same dose would be given, but the maintenance dose is administered at eight-hourly intervals. (2) If many follicles are present they should be expressed mechanically as in the classical methods of treatment of trachoma. (3) If there are no follicles, or after they have been expressed, daily painting of the affected palpebral conjunctiva with sodium sulphacetamide 30% should be carried out for six to twelve weeks. Sulphacetamide ointment 6% in a suitable base should be instilled three times daily into the conjunctival sac. The response is generally satisfactory. The dense scarring seen with the older methods does not occur; the conjunctiva shows instead a pearly blue coloration. There is no need to use any other reagent apart from sulphonamides locally, except atropine where the corneal condition calls for it. Where there is much pannus daily massage with a glass rod over the affected cornea is helpful.

Tuberculosis and Marriage

Q.—*What advice should be given to a man with tuberculosis who wishes to marry and have children?*

A.—When a person with tuberculosis marries, difficult situations usually arise and responsibilities have to be faced which are not normally encountered in the marriage of healthy people. It is for the parties concerned to decide if they are able to undertake these responsibilities and attempt to overcome the problems that may arise. The two important features of such marriages are (*a*) that the tuberculous person is liable to relapse and thereby cause a serious economic situation in the home, and (*b*) that the infection may spread to the healthy partner and to the children. It is possible for tuberculous persons to marry and have children who grow up without developing tuberculosis. This has been proved at all the village settlements, but in these cases the home is under supervision, the patient or ex-patient lives in an ideal environment and is employed in suitable industry under medical supervision, and the children are examined frequently. Even under these favourable circumstances relapses do occur and difficulties do arise. The whole problem of marriage in the case of the tuberculous is a matter of personalities and economics, which vary with every case. No general rule can be given except that the risks must be fully explained to each party and the decision left with them.

Male Hormone Assay

Q.—*Is the capon test still the international standard for measuring androgenic activity? Is it still considered the most accurate? What are the details of the procedure, and can baby chicks be substituted for capons?*

A.—The present international standard is crystalline androsterone, the international unit of male hormone being 0.1 mg. of the international standard preparation of androsterone. The capon test is employed for comparing its biological activity with that of a preparation to be assayed so that "the international unit of male hormone activity" is "the activity of 0.1 mg. of the international standard preparation of androsterone, as measured by a specific biological reaction." Castrated brown leghorns are used, but they are large birds, and they are castrated at 1–2 months; the test is most suitably carried out at 6 months of age. Bantams are smaller and suitable even when castrated as adults. The growth-dose-response curve of the comb measured photo-electrically determines the assay. The method is very accurate for a biological test, and an alternative one is the increase in the weight of the prostate and seminal vesicles of a castrated rat. The capon unit (c.u.) is defined as the amount of androgenic substance which, when administered to each of three capons on two successive days, produces in the course of the third or fourth day an average increase of 20% in the area of the comb. Ruzicka found that 60 micrograms of androsterone had the biological action corresponding to 1 capon unit. For further details the inquirer is referred to a book by J. H. Burn, *Biological Standardization* (Oxford University Press, 1937).

Dosage of Penicillin

Q.—*During the past year or more the use of penicillin in doses of 100,000 to 500,000 units once or twice daily for ambulatory patients has become increasingly popular. This form of treatment appears to be given for a variety of infections both acute and chronic. Is this sound practice, and has it the support of recognized authority?*

A.—This question is answered in part in the paper by Garrod and Shooter which appeared in the *Journal* of May 20 (p. 1169). In their view, doses of 500,000 units should be given at intervals of not longer than twelve hours in order to ensure full therapeutic effect. On the same basis, doses smaller than this would require to be given more frequently, and no feasible dose would suffice if given only once daily. On the other hand, much depends on the condition being treated; gonorrhoea is quite exceptional, owing to the rapidity of the effect produced, and the milder forms of other infections may respond to treatment which would be inadequate in more severe cases. These remarks apply only to the use of ordinary solutions of sodium and other highly soluble penicillins. If procaine-penicillin preparations are employed, the interval between doses can be 24 hours or even longer.

Weil-Felix Reaction in Q Fever

Q.—*Is the Weil–Felix test positive in Q fever?*

A.—The Weil–Felix reaction is not positive in Q fever. The rickettsia of Q fever (*R. burneti*) has been cultivated, like other rickettsia, in the yolk sac of the chick embryo, and a killed suspension, usually the Henzerling strain, is used as antigen for the complement-fixation test with the patient's serum. Samples of sera should preferably be obtained in both the early and convalescent stages of the suspected infection. Titres of 1:10 or higher are generally taken as evidence of previous infection,

but rickettsial complement-fixing antibodies may persist for long periods, so that a rise in titre during convalescence would be the strongest indication of recent infection (see Stoker, M. G. P., *Lancet*, 1949, **1**, 178).

Local Action of Magnesium Sulphate

Q.—*What is the precise action of magnesium sulphate in the treatment of boils and abscesses? Is it necessary for the skin to be broken before the application of magnesium sulphate is likely to be beneficial?*

A.—A preparation of 50% magnesium sulphate in water or glycerin is widely used as a local application to areas of superficial inflammation. It is often applied hot. The relief of pain which is sometimes observed is probably due mainly to local heating of the tissues. The evidence that the solution exerts an osmotic effect, thus reducing tension in the lesion, is dubious, and such an effect certainly could not be expected to occur through intact skin. There is some evidence that the magnesium ion has a weak local analgesic action on cutaneous sensory nerve endings. This action is sometimes invoked to justify its use in the treatment of erysipelas.

Cancer in Young Patients

Q.—*Is there any evidence that carcinoma is becoming more common in the lower age groups? In the last year or two in practice I have seen three cases of cancer of the cervix, two of cancer of the lung, one of breast cancer, and one of cancer of the colon in patients between the ages of 28 and 43.*

A.—There are no suitable data from which the trend of incidence can be estimated, but the available evidence from the recorded deaths suggests that there has been an increase in cases of carcinoma in the younger age groups in recent years. A comparison over a period of years is not possible for several reasons. The basis of selecting the underlying cause of death when another disease was mentioned in association with cancer was changed in 1940. Under the old system of rules a very high priority was given to cancer over other diseases, whereas the certifying physician often considered cancer to have been merely a contributory cause. The present method of the physician's choice reduces the mortality rate from cancer. Again, it is only in recent years that sarcoma and carcinoma have been differentiated in the published data. Any comparison over a period of all types of cancer at the younger ages is also invalidated because in 1940 glioma was added to the group defined as cancer. In the early years of life glioma contributes one-quarter and sarcoma over one-half of the total deaths from cancer. The latest available data are:

Age	Mean Annual Death Rate per Million Living						Per Cent of 1931–5		
	Sarcoma		Carcinoma		Cancer Undefined		Sarcoma	Carcinoma	Undefined
	1940–2	1943–5	1940–2	1943–5	1940–2	1943–5	1940–5	1940–5	1940–5
Males									
0–	22	21	3	4	3	4	92	168	338
15–	26	28	18	19	3	4	94	146	110
25–	27	30	93	92	9	8	82	126	127
35–	51	48	398	413	32	27	81	122	92
45–54	93	93	1,458	1,520	102	99	77	112	78
Females									
0–	16	18	4	4	3	3	93	208	302
15–	18	16	16	18	3	3	84	117	101
25–	22	19	126	132	12	9	91	112	103
35–	34	32	607	597	38	36	84	99	71
45–54	60	68	1,809	1,739	113	112	75	101	67

(Gliomas are excluded from this table.)

The comparison with 10 years earlier shows that sarcoma is at a lower level while carcinoma has increased. Although the relative increase is large the rise in the actual number of deaths is small, since a rise of 1 per million in the death rate is only equivalent to approximately 3 deaths in these age groups for the whole country. Because of this small rise in the number of deaths it is not likely that in a small area the trend of mortality would show fluctuations greater than those attributable to chance.

Residential Epileptic Schools

Q.—*What diurnal frequency of major epileptic attacks justifies the admission of a child to a residential epileptic school in the absence of serious personality changes or other complications? Would a total of three major convulsions in class in a session of nine months justify exclusion from an ordinary day-school? The child has had no major convulsions at other times, outside school hours, in this period.*

A.—It is impossible to lay down absolute rules about what frequency of diurnal epileptic attacks in a child would justify admission to a residential epileptic school. The child's home circumstances, and in particular the parents' attitude to the child's disability, are of obvious importance. In the specific case mentioned three major attacks in the course of nine months would not seem to justify the exclusion of a child from an ordinary day-school if the child is mentally normal and does not have attacks of epileptic automatism. It is possible that with further adjustment of treatment the incidence of attacks might be even further decreased.

Peanuts and Vitamins

Q.—*What is the vitamin content of fresh peanuts? Is any harm likely to result from their free consumption in the Tropics?*

A.—Peanuts contain the following vitamins:

Carotene	63	micrograms per 100 g.
Vitamin B_6	300	,, ,,
Pantothenic acid	2,500	,, ,,
Biotin	18	,, ,,
Vitamin B_1	300–960	,, ,,
Riboflavin	160–500	,, ,,
Nicotinic acid	8,600	,, ,,
Vitamin C	10	milligrams per 100 g.
Vitamin D	Nil	
Vitamin E	26–36	milligrams per 100 g.

No harm is likely to come from the free consumption of peanuts if properly chewed.

NOTES AND COMMENTS

Tremor in Parkinson's Disease.—Mr. H. A. KIDD (Garshalton) writes: In the answer given to this inquiry (July 1, p. 60), cervical sympathectomy was not mentioned for the relief of tremor, but is, I believe, worth trying in these cases where tremor, as opposed to rigidity, is the main disability. I published a report on such a case in the *Journal* (1933, **1**, 99), and a preliminary test could easily be made by injection of "novocain."

"Golf Elbow."—Dr. W. H. EDGAR (Alverstoke) writes: Some years ago you permitted a correspondence on the subject of "Tennis Elbow." It would now appear that "Golf Elbow" is in the news (July 15, p. 177). In the correspondence to which I refer I contended that the great majority of these "elbows" are due to the overstrain of the forearm muscles at their insertion into the epicondylar ridges due to the prolonged grasping of some instrument. I had come across "elbows" in such diverse activities as riveters, oarsmen, wood sawyers, as well as tennis and golf players. The common factor in these matters is the prolonged act of grasping. Most amateurs and novices grasp things too tightly and hence get an "elbow." The treatment is rest, heat (diathermy), or local injection of some pain-reliever.

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